Create

Conventional Stop Lights ~~Found~~ Gas Gluttons

By Jeffry Beeler
CW Staff

MINNEAPOLIS — American drivers could save more than a million gallons of gasoline daily if conventional stop lights were replaced with computerized traffic control systems, according to a report issued by Honeywell, Inc.'s Traffic Management Center (TMC) here.

The report, prepared for the Federal Highway Administration (FHA) and the Federal Energy Administration, details the findings of a 1976 study of driving conditions in three U.S. cities and their effect on fuel economy.

In that study, Honeywell used FHA-supplied data to develop computer models of street sections in the three cities. Those sections included the Urban Traffic Control System (UTCS) network in Washington, D.C.; the intersection of Shattuck and Alcatraz in Berkeley, Calif.; and parts of the Hawthorne arterial highway in Los Angeles.

With the computer models, Honeywell then simulated each city's driving conditions and noted the effect of variables like traffic control procedures, traffic volumes and street characteristics on gasoline mileage.

More specifically, the fuel consumption study entailed models of six typical traffic control situations. Some of the situations simulated and evaluated by Honeywell included a street-crossing system known as a "pedestrian scramble," arteries with exclusive bus lanes, one- and two-way streets and roadways with pretimed and "fully actuated" signal systems.

In pretimed systems, the length of the signal cycles remains constant regardless of traffic levels; in fully actuated systems, cycle lengths vary with auto volume.

Other simulated situations focused on variations in traffic demand and on traffic signals with varying cycle lengths.

Among their findings, experimenters concluded that a fully actuated traffic control system on Los Angeles' M St. would yield

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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Dope/DP Caper Linked to Agent

NEW HAVEN, Conn. — A special agent for the U.S. Drug Enforcement Administration (DEA) allegedly embezzled computer printouts from the Narcotics and Dangerous Drugs Information System (Naddis) for use in a scheme to identify DEA informants and facilitate importation of marijuana, according to a grand jury indictment issued here.

The indictment against special agent Paul A. Lambert and alleged coconspirator George E. Girard Jr. included charges of embezzlement, receipt and sale of DEA records, plans to import marijuana from Mexico, possession of cocaine and defrauding the U.S. through interfering with the DEA's conduct of business.

Girard allegedly planned to use information from the DEA and other government sources to avoid border patrols while flying in marijuana from

(Continued on Page 4)

Hit Ratio 'Not Impressive'
Study Questions Worth of NCIC

By Edith Holmes
CW Staff

WASHINGTON, D.C. — The National Crime Information Center (NCIC) has not proved its worth as a crime-fighting tool despite 10 years of operation, a preliminary report by the Scientists Institute for Public Information (Sipi) concluded here recently.

Prepared in response to a congressional committee's inquiry into NCIC operations, the report said that for such "a vast system, containing over six and one-half million records with 250,000 transactions per day, the 'hit' ratio was not demonstrated to be impressive.

"The actual benefits of NCIC still remain in the area of surmise, rather than demonstrated results," the report said.

Sipi's Task Force on Science and Technology in the Criminal Justice System, which made an on-site inspection of the NCIC at the J. Edgar Hoover Federal Bureau of Investigation headquarters in the nation's capital, said the system has about 1,000 hits per day. Fifty percent are for stolen vehicles, 20% to 25% are for wanted persons and the rest are scattered over six other categories.

"The maintenance of the huge NCIC system, growing every year, may be subject to question when there is no demonstration that the 1,000 daily hits provide a significant benefit to law enforcement, and [when] comparable information may be available by other means, at cheaper cost and with less significant problems involving intergovernmental relations," the report maintained.

Officials at the FBI, which manages and maintains the system, defended their operations and criticized the report.

(Continued on Page 6)

New I/O Proposal Reflects Diluted Standard Support

By Molly Upton
CW Staff

WASHINGTON, D.C. — The National Bureau of Standards (NBS) is apparently watering down its support for a channel-level I/O interface standard for federal government users.

In a proposal recently submitted for public review and comment, NBS revised the requirements that would make federal agencies adhere to the standard in selecting computer systems.

The changes reflect a "compromise" with mainframe manufacturers who oppose the standard, an NBS spokesman said.

The revisions do not alter the technical specifications, which were designed to allow the attachment of IBM-compatible peripherals to any CPU, but rather allow government agencies more latitude in their purchases.

The original standard — which is based on the IBM channel interface — was drafted by the American National Standards Institute (Ansi) X3T9 committee and by the NBS as a proposed Federal Information Processing Standard (Fips).

While that original Fips proposal required all channels of new and replacement systems to conform to the specifications, the new revision requires only that the system "support" one to four interfaces and allows agencies to procure equipment with no such interfaces.

"All such interfaces shall be specified

(Continued on Page 4)

Edelstein Names Examiner To Search IBM Tape Files

By Catherine Arnst
CW Staff

NEW YORK — Judge David N. Edelstein, apparently agreeing with government charges that IBM has withheld certain damaging information from government trial attorneys, has appointed an examiner to search the firm's corporate files.

The information the Justice Department wants is IBM's Lease Base Machine Inventory (LBMI) and Purchase Base Machine Inventory (PBMI), both part of IBM's management information system. These tapes are alleged to contain an accounting of all IBM equipment delivered and installed since 1960.

The government contends IBM could provide the court with an accurate measure of the systems market IBM allegedly monopolizes.

IBM contends such information does not exist, and if it does, it is only on an ad hoc and unreliable basis.

Edelstein ordered that Herbert H. Isaacs, a director with Arthur Young & Co., be appointed to report to the court "what tapes, other files, programs, documentation and other information [IBM] possesses and whether [IBM] has produced such material which will enable the plaintiff to determine cer-

(Continued on Page 5)

IBM 3033 Overbooked?

If you are number 801 on IBM's 3033 delivery list, maybe you should consider pricing some other system.

IBM is planning to manufacture only 800 Model 3033s, despite having orders for more than 2,000 systems, according to Australia's *Computer Weekly* newspaper.

IBM would not confirm or deny the rumor, saying only that such information is proprietary and of a nature that IBM does not discuss.

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In Boston, Atlantic City

Micro Exhibitors Vie for Business

By Frank Vaughan
CW Staff

ATLANTIC CITY, N.J. — Two hobby computer shows were held on the East Coast in the space of four days recently — Computermania in Boston and PC '77 here.

Though both were devoted to microcomputing, they took on quite different personalities.

Technical sessions at the hobby gatherings ranged from concurrent seminars held during exhibit hours at both shows to additional preshow workshops here.

Most subjects relating to microcomputers were covered, including interfacing, programming, debugging, music and applications.

Slow Start

The Boston show seemed destined to a slow start when, just before the doors opened for the first day, almost 40% of the exhibitors had failed to show up or set up displays. This, combined with the spaciousness of the exhibit hall, gave the impression of a show that might not get off the ground. Even the building failed to cooperate as, shortly before opening, a huge lighting fixture fell from the ceiling and crashed into an aisle.

The first place for which most people headed was the well-publicized Radio Shack display. Crowds packed eight to 10 deep became a constant sight at that exhibit, evidencing the success of the promotion, which had focused on the Radio Shack TRS-80 microcomputer system.

Retail computer stores also drew large crowds as they offered visitors an opportunity to examine mixed-vendor systems and comparative systems. Components sales firms also attracted large crowds. The do-it-yourselfers came with checkbooks and shopping lists in hand, and many returned on Saturday to take advantage of last-day markdowns by vendors that were reluctant to take unsold merchandise "back home."

Coverage of Computermania and PC '77 continues on Page 75.

Yet many of the show's visitors left disappointed. Many were businessmen who were given the "surface illusion that they could solve all their business problems for $595 with a simple little computer. But they can't," according to Sonny Monosson, president of Boston's American Used Computer Corp. Monosson described the attendee's options as a "delightful computer hobby or a devastating business mistake."

Estimates of attendance at the three-day event ranged from a high of 14,111 paid attendees reported by show sponsors to lows of 5,000 to 7,000 reported by several exhibitors and other observers.

Atlantic City Exciting

PC '77 here had an entirely different flavor, though. A genuine excitement could be felt as exhibitors set up. That excitement was continued as the crowd began arriving several hours early to overflow the Shelburne Hotel's lobby and spill out onto the famous boardwalk. The long line for hall entry lasted much of the morning, yet visitors remained cheerful during waits of more than an hour.

The stars of the show had to be Radio Shack and Heath Co. This was the first public showing of the Heath systems and many visitors said they would have come just to see the firm's offerings. As it was in Boston, one could hardly get by the Radio Shack exhibit at times, despite the wide aisles. It was virtually impossible to get past Heath much of the time.

No attendance figures on PC '77 were available from show organizer John Dilks, who works as a computer-switching equipment installer for the telephone company. But exhibitor estimates ranged from 8,000 to 12,000 for the two days. Attendance at the related technical sessions was generally high and meetings of computer store owners as well as a manufacturers' association gathering drew relatively large groups.

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Take sorting operations, for example. They represent a big chunk of those "large volumes of work in an unpredictable mix." In fact, your MVS system may spend 20 or more percent of its time doing *nothing* but sorting.

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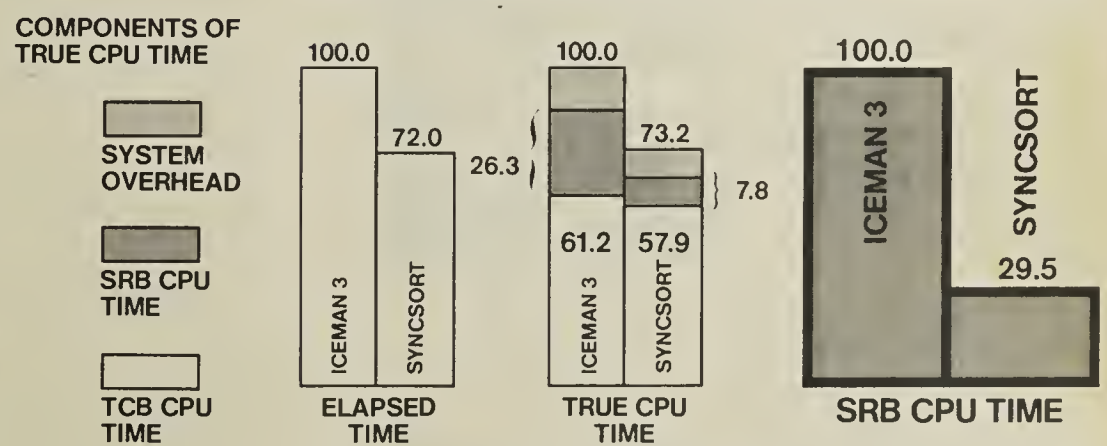
Take a look at the charts below. They compare SyncSort's overall MVS performance with IBM's 5740-SM1, Release 3. And the two on the right pinpoint the SRB Time differences.



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Latest I/O Interface Proposal Draws Criticism

By Molly Upton
CW Staff

The proposed changes to the federal government's implementation of the channel-level I/O interface standard "make a mockery out of the federal ADP standards program," according to Norman Ream, who was the first director of the National Bureau of Standards' (NBS) Institute for Computer Sciences & Technology.

"I'm bitter. I think [NBS] bent over backwards to satisfy the system manufacturers and it's a totally unenforceable standard," he said.

There's no requirement for an installation of the interface in the first place. If an adapter is to be used, there's nothing that requires manufacturers to demonstrate and verify its capabilities, he said.

The adapter's capabilities and cost benefits should be considered as part of the total evaluation of the system, Ream continued.

Harry S. White, associate director of ADP standards at the Institute for Computer Sciences & Technology, indicated that the revision is "a little softer" and represents "what's to be considered a reasonable compromise."

The mainframers are admitting the revision is more palatable; however, they still don't admit the need for a standard, he said.

White admitted federal procurement officers will probably encounter some complexities with the new proposal, especially in the area of cost benefit appraisal.

The changes were developed by the NBS technical division and NBS decided to go with the revision and see "to what extent it flies," White indicated.

Ream does not think the latest proposal will go through. "I don't think [Jack] Brooks' staff or Congress will stand still for this," he said, adding he expects the House Committee on Government Operations, headed by Brooks (D-Texas), to protest strongly.

NBS had not yet received any formal comments on the proposal, White said, but a spokesman for Brooks' office indicated there are plans to submit a comment.

'Very Political Process'

A.G.W. (Jack) Biddle, president of the Computer and Communications Industry Association (CCIA), commented that standardization has become a "very political process" with the mainframers threatening not to do business with the federal government under the original proposed standard.

Ream, in a draft of a letter to Commerce Secretary Juanita Kreps, described the shortcomings of the proposal and the effects it will have on the federal government's standardization efforts.

Although Ream recognizes Kreps is subject to much pressure, he said "if you give an inch you will find yourself and the department and the Fips [Federal Information Processing Standard] program on a slippery slope at the mercy of the forces that have their own blind and perverse logic."

"The failure to adopt a standard for the last 10 years has acted and continues to act as a severe restraint to competition in the federal procurement process," Ream stated.

It also has resulted in selected manufacturers obtaining indirect subsidies of at least $250 million, Ream said.

He estimated the government paid the $250 million over and above what it would have if a standard had existed requiring the ability to interconnect foreign peripherals.

"The increasing and almost overwhelming reliance of the federal government and its activities on information and the use of ADP operations . . . has developed to the point where action must be taken to protect the general public," he said.

"We have to have as part of our ultimate federal information policy the ability to fully interconnect competitively procured equipment," he declared.

For if one becomes dedicated to one manufacturer, "you have no way out but to go with [it] and if one manufacturer decided to take a walk for a few weeks, that could bring everything to a complete halt," he said.

The NBS report, "Fiscal Year 1979 Brooks Act Program Issue," distributed last May, identified the interface standards program as the most critical, Ream said. "If this one doesn't go, you might as well forget the others such as device-level interfaces."

Ream planned to send a copy of his letter writtn to Kreps to Sen. William Proxmire (D-Wis.), whose subcommittees on the priorities and economy in government issued a report in 1970 indicating the federal government could save money through interconnection of equipment.

Draft Reflects Diluted Standard Support

(Continued from Page 1)

as separate mandatory options, the cost of which will be considered in the evaluation conducted as a part of the system or system component selection process," according to the new proposal.

The reason for specifying that a system need only have four interfaces conforming with the standard is to prevent the standard from serving as a basis for sole-source procurement on the number of channels offered by various mainframe makers, according to Harry S. White Jr., associate director for ADP standards at NBS.

Verification of operation of the interfaces in conformance with this standard must be provided, through demonstration or other means, prior to the government's commitment to acquire the system, the new proposal states.

In installing a system with none of the standard interfaces, the government must obtain contractual assurance that the "required number of interfaces conforming to this standard can and will be supplied at any time during the designated life of the system at specified cost to the government."

Regarding modification of systems, the old proposal specified that the standard interfaces should be included on equipment added to or replacing gear that originally met the standard specifications.

Acquisition Alternatives

The new proposal, however, specifies only that "acquisition alternatives that comply with this standard shall be considered competitively with other alternatives, so as to meet the government's data processing requirements at least cost."

These alternatives shall include "those available through exercising the contractual options for interfaces conforming to this standard which were established at the time of initial system acquisition," the proposal continued.

Subject to Review

The new proposal indicates the standard shall be subject to review by NBS within five years after its effective date, "taking into account technological trends and other factors, to determine whether the standard should be reaffirmed, revised or withdrawn."

The conditions under which a waiver may be obtained were shortened under the new proposal to simply "heads of agencies are permitted to waive the requirements stated in this publication. However, such waivers shall be coordinated in advance with NBS."

The effective date of the new proposal is Oct. 21 of this year compared with the originally scheduled Jan. 1, 1978.

Written comments should be sent to White at the Institute for Computer Sciences and Technology, U.S. Department of Commerce, National Bureau of Standards, Washington, D.C. 20234.

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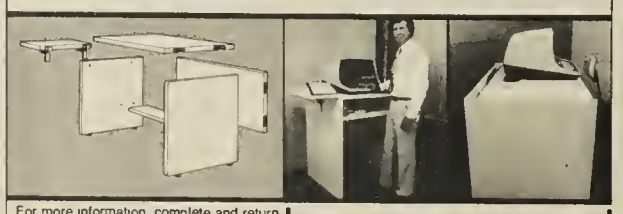

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Agent Cited in Data Theft

(Continued from Page 1)

Mexico and also planned to sell the data to others, according to the indictment.

He and Lambert planned to use data from the DEA to identify prospective importers, purchasers and distributors of drugs as well as possible government informants and the status of current investigative efforts, according to the indictment.

Lambert allegedly accessed the Naddis system three times — on July 8, 19 and 21. As of July 28, he had printouts on five individuals, the indictment said.

The Naddis system, based on an IBM 370/155, requires entry of an access code from a terminal. Once on the system, the user has access to all stored data, a DEA spokesman said.

Lambert normally had access to the type of data involved in the charges against him, the spokesman added.

Lambert has been suspended without pay from the DEA pending resolution of his case, a DEA spokesman said.

Both men entered pleas of not guilty before the U.S. District Court here following the grand jury indictment. No trial date has been set and the two are out on bond, court sources said.

Attorneys for both Lambert and Girard declined to comment on the case.

Jury to Hear Corporation's Defense

IBM Foiled in Bid to Ring Down Forro Curtain

By Molly Upton
CW Staff

SAN FRANCISCO — IBM will finally have a chance to practice its defense tactics before a jury in an antitrust case — Forro Precision, Inc.'s suit against the corporation.

Judge Ray McNichols has denied IBM's motion for a directed verdict, placing the responsibility for the finding of guilt or innocence in the hands of the jury.

The case is not based solely on antitrust grounds. It also includes charges by Forro that IBM interfered with its business while investigating alleged trade secrets thefts.

IBM's counterclaim charges Forro with unlawful market presence and misappropriation of trade secrets.

Commenting on McNichols decision, an IBM spokesman said: "We recognize that [directed verdicts] are rarely granted. We have every confidence in our defense and the merits of our counterclaim."

Two other antitrust cases brought against IBM by Greyhound Computer Corp. and California Computer Products, Inc., and heard by juries received directed verdicts.

The Greyhound decision was recently overturned and the case ordered back to trial [CW, Aug. 29]. McNichols' ruling in the Calcomp case is being appealed.

The only other antitrust case in which IBM presented its defense was brought by Telex Corp., but that was heard by Judge A. Sherman Christensen without a jury.

Forro dropped its claim under Section 1 of the Sherman Act but is continuing to press for damages under Section 2, a Forro source said.

To expedite matters, Forro and IBM have stipulated what the market was and IBM's share, rather than having expert witnesses give their versions, he continued. IBM defined the market as the worldwide electronic data processing and services mart and estimates it has 35%, he added.

Forro is seeking damages of $2.5 million to $9 million.

If the jury finds IBM guilty of antitrust violations, Forro would be entitled to treble damages. Punitive damages could be awarded on some of the other counts, the spokesman explained.

The trial is expected to end soon, he said.

Examiner Picked To Search Files

(Continued from Page 1)

tain information."

In this order — his third directed to the subject — Edelstein expressed his frustration over being faced with attempting to bring about a resolution of this controvery.

Previous Orders

The subject of the LBMI and PBMI files has come before the court twice before on (Sept. 19, 1975 and Nov. 30, 1976) and both times Edelstein has ordered IBM to produce the information.

"While there is no question that [IBM] has undertaken to produce information to [the] plaintiff pursuant to the court's orders . . . the court is not persuaded that the production that has been forthcoming from IBM comports with the spirit and intent of those orders," Edelstein wrote in his order of last month.

Thomas D. Barr, IBM's lead counsel in this case, claimed that "I have personally and continually assured [the Justice Department] that IBM has made prompt, full and complete production under that [Nov 30, 1976] order . . . [The Justice Department] has plainly not looked at what it has and earlier [its] counsel have explicitly rejected what its new trial staff members now want. This whole matter has been placed in the hands of the most junior of plaintiff's counsel. They do not — and really cannot be expected to — understand the material which they have been given.

"If they had reviewed the material with which they have been furnished and understood it, I believe this motion would not have been made," Barr wrote in an affidavit filed with the court.

By asking for an examiner, "plaintiff no longer even wants the responsibility of asking for what it wants," Barr continued. An examiner would be "nothing more than a court-appointed assistant to help the department do the job it can and should do for itself."

Last November, Justice Department attorneys requested that an auditor be appointed to determine whether IBM has the information it was seeking. At that time, Edelstein determined such an appointment was unnecessary. In his most recent order, however, he determined that "the conduct of defendant and the highly technical nature of the production . . . presently constitute 'exceptional conditions' warranting the appointment of an examiner."

Isaacs' power as an examiner will be broad, giving him access to all files, documents and employees of both parties. He will then file a report with the court. Either party may appeal the report, however.

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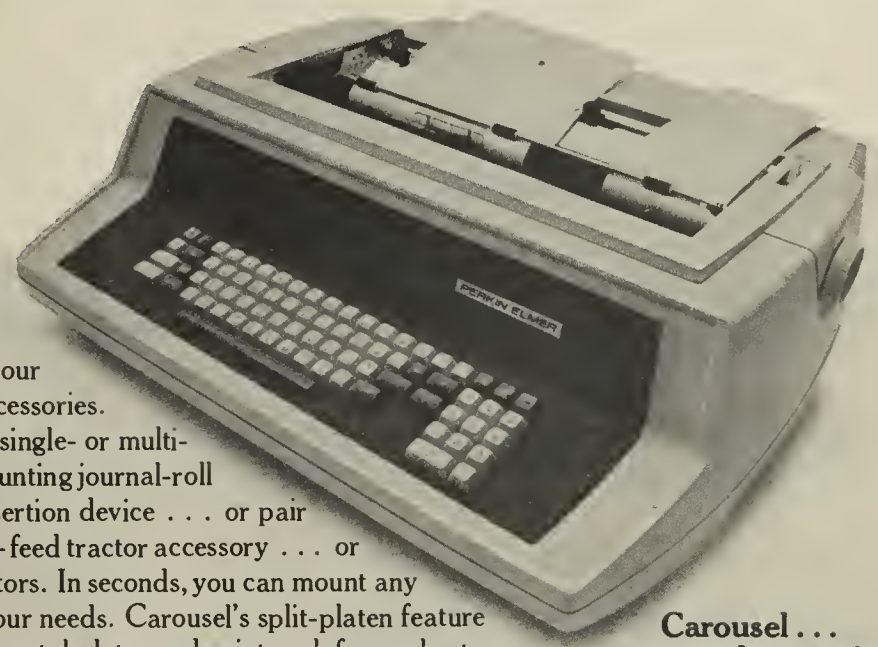

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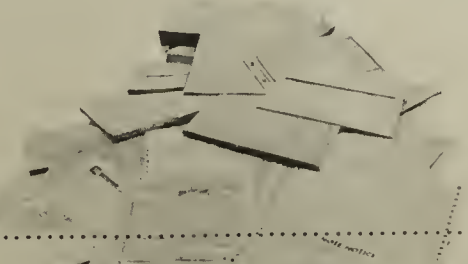

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Report Charges NCIC Has Not Proved Worth

(Continued from Page 1)

Some of the criticisms in the report were invalid and some were wrong; in addition, the scientists failed to acknowledge the need for a high-speed method of detecting wanted persons and stolen goods in a society in which criminals can be very mobile, the FBI officials said.

"The system creates a high risk of detection" for criminals, according to Frank B. Buell, the FBI section chief in charge of NCIC operations. "There's just no question about it."

But the scientists involved in the inspection found otherwise. Included in Sipi's task force were Daniel D. McCracken, who chaired the task force and is vice-president of the Association for Computing Machinery; Joseph Weizenbaum, professor of computer science at MIT; and Dr. Myron Uretsky, director of the Management Decision Laboratory at the New York University Graduate School of Business Administration.

Rep. Don Edwards (D-Calif), a former FBI agent who heads the House Judiciary Committee's Subcommittee on Civil and Constitutional Rights, helped arrange the meeting between Sipi and the FBI officials responsible for NCIC, according to John J. Kennedy, director of the task force.

Edward's subcommittee, which has oversight responsibilities for the FBI, will hold hearings beginning Sept. 29 to discuss NCIC operations in hopes of educating members of Congress about the system. The computer scientists on the task force and FBI officials will be among the witnesses appearing.

No Regular Audits

The Sipi Task force found there is no regular auditing of NCIC data and procedures by a relatively independent auditing authority. Currently, each state audits its own Computerized Criminal History (CCH) Information.

"Neither the FBI nor any other agency except the submitting state audits what goes into the system and how it goes in," the report stated. The task force added that "independent audits, both announced and unannounced," are crucial to maintaining data accuracy and integrity.

Further, there have been no studies, evaluations or reports which give hard data on the benefits to criminal justice as a result of NCIC, the task force said.

NCIC downtime is "excessive," the task force concluded following its July 12 visit to the installation. There are about 30 hours per month of unscheduled downtime and about two hours to three hours per month of scheduled downtime.

"Although the system has 94% uptime . . . this would be an unacceptable record in most commercial enterprises," the task force pointed out.

The FBI plans to request funds for some "costly equipment upgrading designed, in part, to solve this problem of downtime," the report added.

The Sipi group also commented on the FBI's methods of editing old records out of the system. "Expungement from the system does not mean true expungement of a record," the report said.

NCIC necessarily maintains backup tapes and a log for system reliability purposes, the study noted. However, because backup tapes and a log exist, "expungement" from NCIC "really means that the expunged data is not available on-line, but does exist on tapes that are kept at FBI headquarters," the report stated.

One of the side benefits of not completely editing old data out of the system is to defend law enforcement personnel from lawsuits by pointing to data that was previously maintained in NCIC, the report said. At least eight lawsuits resulting from the use of NCIC information have been filed to date, one involving the Operations' section chief.

The task force found arrest records remain in the system without updating of the outcome of the arrests. "As the system is now operated, a person will have an arrest record maintained indefinitely in CCH whether or not he is ever convicted in a court," the report noted.

Describing the NCIC correction and updating procedures as "cumbersome," the task force expressed the belief that people should be informed periodically if a record is being maintained concerning them, a practice not followed at present.

"There are serious security and privacy considerations when between 6,600 and 7,000 terminals can access NCIC nationwide," the task force said. "As the number of terminals increases, with a potential of 45,000 local, state and federal criminal justice user terminals, the opportunities for abuse also increases."

Despite nearly six years of CCH operation, only 11 states are participating in that portion of NCIC by providing some input; of these, only two states provide the system with all their arrest records, the report said.

CCH records make up about 16% of the total number of NCIC records.

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Traffic Lights Waste Gas

(Continued from Page 1)

50% fewer delays, about 25% greater fuel economy and 50% higher vehicle speeds than a pretimed signal system.

TMC experimenters created the traffic models with a Control Data Corp. Cyber 74 system at the University of Minnesota here. Besides the 145,000-word mainframe, the all-CDC configuration included a Model 405 card reader, Model 501 line printer, a seven track Model 607 tape drive and a Model 844/21 disk drive unit.

Honeywell obtained the data on which the Berkeley and Los Angeles models were based from highway studies conducted by the California Transportation Department, which in turn forwarded the information to the FHA. Data for the UTCS model was collected by the FHA itself, which conducts its own highway studies in the Washington area.

To ensure the accuracy and reliability of their data, both the California Transportation Department and the FHA hired trained traffic engineers to supervise their studies, according to Lee Sanderson, director of research and development at the TMC.

Although it recommended the report as a guide in planning urban traffic control strategies, Honeywell cautioned against generalizing its test results to other localities. The test results "are heavily dependent upon the specific types of traffic scenarios studies," the report warned.

Six Experiments

In the first of their six tests, experimenters attempted to gauge the effect of one- and two-way streets on gas mileage and traffic conditions. Using a computer model of Washington's UTCS network, they found that, compared with two-way streets, one-way streets averaged 25% higher speeds during peak traffic periods and 19% higher speeds in off-peak hours.

This greater traffic flow translated into an 11% and 13% rise in fuel economy during off-peak and peak periods respectively. The experimenters attributed the improved gas mileage to the one-way streets' fewer stops and shorter delays.

In a second experiment, Honeywell researchers performed a similar comparative analysis of a conventional pedestrian movement system and a pedestrian scramble system, which allows walkers to move in all directions across an intersection, including diagonally. A computer model of the Shattuck-Alcatraz intersection showed the scramble system provided 35% to 48% less fuel economy than the conventional pedestrian system and slowed auto traffic 66%.

Another of the six tests used simulations of the UTCS network and Los Angeles' Hawthorne Blvd. to assess the effect of various traffic signal cycle lengths on gasoline mileage. Using a software package developed by the British Road Research Laboratory, the experimenters found cycle lengths that optimize traffic flow are shorter than cycles that optimize gas mileage.

The researchers also observed that lengthening the intervals between signal changes increases both traffic delay and fuel consumption.

These findings confirmed earlier studies of the impact of cycle lengths on fuel efficiency and traffic flow rates, the report noted.

In a test relating gasoline mileage to traffic congestion, computer simulations of the Washington UTCS network showed average vehicle speeds dropped from 12.8 mile/hour to 11.6 mile/hour and then to 8.6 mile/hour as auto volume jumped from .75 to 1. to 1.25 times nominal levels. As traffic density increased, fuel consumption efficiency declined 22%.

Experimenters noted similar results for computer simulations of the Hawthorne Blvd. network, Honeywell reported.

Tests on the impact of exclusive bus lanes, meanwhile, showed that buses "cause a degradation in overall performance." In simulations of the M St. network, experimenters found that removing a traffic lane from general use decreased vehicle speeds 18% to 45% and gas mileage 15% to 37%.

For Efforts as DP Educator

DPMA Picks Couger 'Man of Year'

By Don Leavitt
CW Staff

PARK RIDGE, Ill. — The Data Processing Management Association (DPMA) has chosen Dr. J. Daniel Couger, professor of computer and management science at the University of Colorado and a regular *Computerworld* columnist, as its 1977 Computer Science Man of the Year.

The award is given in recognition of outstanding contributions to the field of computer science, the DPMA said. This year's presentation will be made during Info/Expo 77, the association's annual conference, on Oct. 12 in Washington, D.C.

Previous recipients of the award, originated in 1968, have included Capt. Grace Hopper — the DPMA's first "man of the year" and Dr. Gene M. Amdahl, founder of Amdahl Corp., who was last year's winner.

Couger earned his award largely because of his influence on the development of computer-oriented curricula in collegiate business education.

"Couger has had more impact on the improvement in education for future managers than any other single individual in the U.S.," according to his nominators.

When Couger entered the teaching ranks in 1965, after 13 years in industry, he was appalled by the lack of computer content in the business school curriculum. His national survey in 1966 indicated that only 11% of all accredited schools of business required computer efficiency of students, according to the DPMA.

After that, Couger exhibited a "missionary zeal" in bringing about a change. A survey earlier this year showed that 94% of all accredited schools of business now require a computer proficiency, largely a result of Couger's effort, a spokesman said.

Couger brought about this change through a four-phase program: 1) writing a book, *Computer and the Schools of Business*, which contained guidelines on adopting and expanding computer curriculum within budget constraints; 2) conducting faculty seminars for more than 1,000 educators representing more than 300 schools of business, on the advantages of computer use in their classes; 3) developing the *Computing Newsletter for Schools of Business*, subscribed to by more than 600 schools; and 4) writing the manual *Fortran for Schools of Business*.

Couger served as associate dean of the University of Colorado's school of business between 1968 and 1972, having joined the faculty at the Colorado Springs campus in 1965. Just prior to that, he was chief of computer plans and controls at Martin-Marietta Corp.

Author of five books and coauthor of five others, he is a member of various DP and educational associations and has lectured in 33 countries.

He received a distinguished faculty award from the University of Colorado in 1975 and in 1973 was awarded second place in the selection for the Dow Jones award, presented each year by the American Association of Collegiate Schools of Business for innovative curriculum among all U.S. schools of business.

Couger now is serving on the editorial board of three professional journals and is coeditor of a series of books in business data processing, published by John Wiley and Sons, Inc. He continues to edit *Computing Newsletter for Schools and Business*.

He is an international lecturer for IBM and has served as consultant for IBM, Control Data Corp., Dow Chemical Co., Hewlett-Packard Co. and NCR.

Couger is listed in *Who's Who in Computing*, *Who's Who in the West* and in *Outstanding Educators in America*.

Dr. J. Daniel Couger

IBM Fails to Appeal Ruling on Greyhound

ARMONK, N.Y. — IBM has failed to take advantage of the 14-day period in which it could have appealed the decision ordering the Greyhound Computer Corp. antitrust suit against it back to trial [CW, Aug. 29].

Its only remaining option now is to petition the U.S. Supreme Court.

The firm has not decided whether to go to the Supreme Court, a spokesman said.

IBM could have filed an appeal for a hearing before the entire panel of the Ninth Circuit Court of Appeals' justices or for a rehearing by the three justices who issued the opinion.

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Decide Not to Compete

Vendors Protest Pre-Bid IBM Order in Dallas

By Jeffry Beeler
CW Staff

DALLAS — About a year before this city began accepting bids on computer systems for its new city hall, a city official apparently ordered $2 million in data processing equipment from IBM.

As a result, Burroughs and Honeywell Information Systems scrapped their plans to vie for the contract and never bothered to submit bids.

Univac also declined to bid on the contract and asked the city to rebid the system as a package. Assistant city manager Jim Favour balked at that suggestion which, he claimed, would give IBM's rivals an unfair competitive edge.

Since Aug. 1, when it officially began accepting bids for the system, the city has received proposals from IBM and three other vendors — Control Data Corp., Itel Data Products Corp. and Thomas Nationwide Computer Corp., a third-party leasing firm.

City officials will not award a contract until they have finished evaluating all four systems and have submitted their recommendations to the city council for review. City manager George Schrader said he expects a decision from the council by Oct. 1.

The controversy arose after spokesmen for both Burroughs and Honeywell charged that Roy Allen, director of data services here, placed a position order for two IBM 370/148s a year before the city began taking bids from other computer vendors.

'No Obligation'

Allen replied, however, that in asking for a position order he was not obligating the city to take the IBM equipment. He argued that he was merely trying to ensure he could obtain the systems on time if the city later decided to use them.

For this reason, Allen said he did not have to clear the IBM position order with the city council, which must approve all municipal purchases of more than $10,000.

Despite Allen's assurances, Don Emrick, Burrough Corp.'s branch manager, said the position order effectively eliminated vendors like Burroughs, Univac and Honeywell from competition for the city hall contract. None of the three firms submitted bids on Aug. 1, and Burroughs and Honeywell never received bid requests from the city on July 11.

In a letter to Schrader, Wayne Howard, a Univac account executive, complained that Allen's actions had discouraged all vendors but IBM from competing for the city hall order. Howard also claimed that even before issuing any bid requests for the prospective computer system, city hall officials had had their new building, which will open in January, electrically wired to meet only IBM specifications.

The wiring decision proves the city had already selected its computer vendor before issuing its recent bid requests, Howard added.

Allen claimed, however, that the new building will be able to accommodate both CDC and Itel Data Products equipment in addition to IBM units.

Request to Start Again

Arguing that the city's restrictive contracting practices had deprived the community and its taxpayers of potential benefits from the computer industry's latest technological developments, the Univac account executive asked Schrader to withdraw all existing bids and start the bidding process over again.

Burroughs' Emrick admitted he becomes "irked" when local and state government agencies apparently preselect their computer equipment instead of opening their contracts to competitive bidding.

Allen denied, however, that the city had preselected IBM as its DP contractor. Besides sending bid requests to various computer vendors, the city solicited proposals through advertisements in daily newspapers, he said.

Although CDC bid almost $800,000 lower than IBM for the CPUs, the Minneapolis-based firm did not include the cost of disk storage devices in its estimate. IBM bid about $1.6 million for the disk units, compared with Control Data's bid of $836,000 for the mainframes alone.

Though Favour rejected the idea of rebidding the city hall systems, he did agree to discuss the contract question in a meeting last year with Univac representatives and two other municipal officials — Schrader and Mayor Robert Folsom.

Univac routinely requests meetings with top local officials when negotiating contracts with city governments, Allen claimed.

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Minnesota 11th State To Enter FBI System

WASHINGTON, D.C. — Minnesota has become the eleventh state to enter and update records in the FBI's Computerized Criminal History system.

The other states that now participate include Arizona, California, Florida, Illinois, Michigan, Nebraska, North Carolina, Ohio, South Carolina and Virginia.

Sociologist: Computers Widening 'Power Gap'

By E. Drake Lundell Jr.
CW Staff

TORONTO — "The gap between the powerful and the not-so-powerful will tend to widen as computer use grows," a sociologist told a session at a recent conference here.

Elihu M. Gerson, president of Pragmatica Systems, Inc. and a former sociology professor, said this effect of computer use raises two problems — first, how to control or eliminate the negative impacts of computers and, secondly, how to provide "some minimum level of access to computer power" for all members of society.

"As with any other technology, control over computers and their impacts tends to follow lines of authority and cleavage which already exist," he said.

"Thus, the most general effect of computer use is to increase the relative advantages of some groups vis-a-vis others," he added.

Gerson called this effect the "Matthew Principle" after the passage in the Bible that states: "For unto everyone that hath shall be given; and he shall have abundance: but from him that hath not shall be taken away, even that which he hath."

Help Powerful

As an example of how computers help the powerful, Gerson cited the case of a firm with over $1 billion in yearly sales. Such a firm can "afford to use elaborate computer systems to support complex market analyses, automated production lines, flexible pricing structures, highly detailed cost-effectiveness studies and many other profit increasing activities."

But its competitor with only $10 million in annual sales can afford only a small amount of computer power and few sophisticated applications.

"Similarly, a government agency concerned with minimizing the expenditure of public money (or maximizing the collection of taxes) can bring very substantial information processing technology to bear on the problem of identifying and eliminating ineligible clients from welfare roles.

"Even the most egregious abuse of individual welfare benefits will not support the computing power needed to monitor a government agency's operations," he said.

"Most of the problems associated with computer use have been with us in one form or another for many years, and perfect computer systems and procedures will not eliminate them," Gerson said.

"Privacy and security, reliability and accuracy of accounting, civil liberties, quality of work life and similar topics have long been subjects of concern; the importance of the computer for these areas is in the way in which computer-based systems can multiply the speed and scope of the intrusions, errors and impositions which people suffer," he added.

Because of this, the need to control or eliminate negative impacts of computer systems becomes political.

"We must consider not only the problems caused by improperly designed or implemented systems, but the distribution of advantages conferred by computing power as well," he said.

Gerson suggested the impact of computing "be measured in terms of the changes in relative distribution of resources brought about by computer use. Thus, every application and system would be assessed in terms of the advantages and disadvantages brought about by the system to each party that has some contact within the system."

For example, if an electronic funds transfer (EFT) system reduces float by $1 billion, "then the EFT system has, in effect, transferred $1 billion from banking customers to banks," he said.

Traditionally, costs and benefits of computer use have been assessed from the point of view of the purchasers of computer equipment and services; the measurement of effects has been in terms of dollars, Gerson said. With his system costs and benefits would be measured not only in terms of dollars, but also in terms of time, skill and morale, he noted.

"Time, like money, is a resource which is unequally distributed in social organizations," he pointed out. "One of the most notable impacts of computing technology is the power of the computer to rearrange the distribution of time in organizations." Computerization "may make significant changes in the pace of rhythm of other activities," he added.

These temporal changes will have both negative and positive effects, he said, noting that while some applications may eliminate drudgery, they may also reduce the number of jobs.

"Computers play an equally significant role in the redistribution of skills," he said. They often increase the range of skills available to an organization, but at the same time" reduce or eliminate the opportunities of individuals in the organization to develop new skills."

Question of Morale

The impact of computers also has to be assessed from the viewpoint of morale, according to Gerson. Effective systems may increase morale, he said, by making work easier and more convenient; poor ones decrease morale by creating more inconveniences than they eliminate.

The indirect effects of computerization on morale are also important, he indicated, including the possible reduction in interpersonal contact after computers are installed.

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Content

The intent of these books is to develop a basic programming skill in assembler language. As a result, the initial emphasis of each book is on a professional subset of BAL along with the related debugging skills. If you did nothing more than master this material (chapters 1-5), I think you would justify the cost of the book several times over.

Beyond this, table handling, subroutine and subprogram linkage, and sequential and ISAM file handling are given primary emphasis. Since these are common programming functions, this material is valuable background regardless of the language you normally use.

Finally, these books show you how to write macro definitions (great background for working with software packages), how to code bit manipulation and translation routines, how to isolate the fields in free-form input data (a common function in teleprocessing programs), and how to work with direct files. This type of material starts you on your way to the more sophisticated tasks required in a computer installation.

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By Jeffry Beeler
CW Staff

RICHMOND, Va. — Take a good look at the farms you pass the next time you take a drive through the countryside. Those old bastions of tradition and rustic simplicity are finally about to enter the age of computerization, and when they do almost every farmer but Old MacDonald will feel the impact.

Of course, disk drives and printouts are still a long way from replacing red barns and silos as mainstays of rural Americana. But the move toward increased farm computerization is already under way, and — in this state at least — the trend is sure to continue if Stephen Dennehy has any say in the matter.

Dennehy, a 22-year-old agricultural economist, works as a field representative of the Virginia Agribusiness Management Association (Vama), a state-funded agency organized in 1974 to encourage increased computer use among the estimated 35,000 Virginia farmers who stand to benefit from such equipment.

Each working day, Dennehy travels the back roads of 13 Tidewater Virginia counties in an attempt to recruit new customers for Vama's computerized farm management accounting system. For an annual fee of $300 per subscriber, that service provides farmers with the detailed financial statistics that Dennehy says growers need if they are to compete successfully in this era of increasingly sophisticated farm equipment.

Subscription Process

To subscribe to the service, farmers merely spend about half an hour completing a prepared income and expense report, which they mail on the 10th of each month to Vama's administrative headquarters in Lynchburg. There, the questionnaire data is keypunched and entered into a 256K-word Honeywell Series 60 Level 66 time-sharing computer at Lynchburg's Fidelity American Bank.

Other peripherals in the Vama computer configuration include a Honeywell Model 500 tape drive unit and four Honeywell printers, including two Model 300s and two Model 200s.

Ten days after the income and expense reports arrive, the computer generates monthly financial statements that provide farmers with detailed records of their personal and business credit, cash flow, labor costs, current net worth and other matters of financial interest.

Once a year, Vama's computer system also generates depreciation schedules and profit/loss statements that include dozens of expense breakdowns like costs per acre and costs vs. revenue.

Reporting Eased

Dennehy credited this wealth of computerized accounting data with simplifying the preparation of farmers' federal income tax reports.

Each line on the system's monthly and yearly financial statements is numbered to correspond to a similar line on the standard 1040 federal income tax form.

When the time comes to file his return, a farmer merely transfers the information on his Vama financial statement to the corresponding slot on the 1040 form.

Dennehy also credited the computerized accounting system with improving farmers' chances of obtaining much-needed bank loans. "The day is gone when a banker can tell how a farmer is doing simply by going down to his place and inspecting his crops," the field representative said.

Little Acceptance

"Farmers are traditionally the worst bookkeepers in the world. What we're doing is offering them the same management tools that people in every other business have had for years," he said.

Thus far, however, the system has won precious little acceptance among its prospective subscribers despite its advertised advantages, Dennehy conceded.

He attributes the low acceptance rate in part to a long-standing rural bias against computers. Many farmers are reasonably satisfied with their financial situations and question the need to rock the boat, he explained.

There isn't a single single- that can touch Tandem in

To begin with, we're twice as good. With multiple processors. It's as simple as this. On-line means on-demand, and one processor won't do. Because any processor, even one of ours, can fail. And if that failure occurs during a peak period of transactions, you're out of business while it's down. And out of luck if you miss your re-start point or clobber your data base. And out of control if you lose or duplicate the transactions in process when the failure occurs.

You need a NonStop™ System.

Tandem has built the world's first multiple processor system, designed from scratch in both hardware and software, to provide non-stop processing—even during a failure—with no penalties in the speed, capacity, throughput or memory utilization of the system.

And it can grow without penalty. Starting with a basic two processor system, users can add processors, memory or terminals incrementally all the way to a fully expanded system of sixteen processors supporting 2048 data communications lines, with individual files of up to four billion bytes fully supported by a comprehensive data base management system. But the best part is that you never have to reprogram. Ever. Your Tandem NonStop System just gets bigger and better. At remarkably low cost.

Why the big ones fail.

The big mainframes are expensive to begin with. And even they can fail. Which can leave you high and dry in the on-line environment. But there are other difficulties with the big numbers, too. Of prime consideration in the on-line world, they offer very limited throughput for their price. And by the time you've hung a lot of communications lines on them, they suffer a derating which makes their performance even less attractive.

And whereas you may eventually need that kind of horsepower in your on-line system, chances are it's an expensive overkill at the outset. What you need is a system which will do the job efficiently on the way in, and grow as your needs grow, in modest price increments. It makes the big systems people wish they were more flexible.

One mini just won't make it.

Minis have made a name for themselves, justifiably. But in the world of on-line, where needs keep growing, the one mini system just can't cut it. With the architectural limitations inherent to a single mini system. growth can build system overhead so fast you'll grind to a halt before you know it.

And strap-ups will kill you.

The answer might seem to be to strap two processors together. One goes down, and the other takes over. Right? Wrong. It's not that simple. System software for a single processor system won't run on the strap-ups. And the fate of any transactions-in-process at the time of a failure is unknown. As is the state of any records being updated. And growth beyond the original system capacity is well nigh impossible.

What you really need is the one multiple processor system designed for multiple processor operation. Tandem's NonStop System.

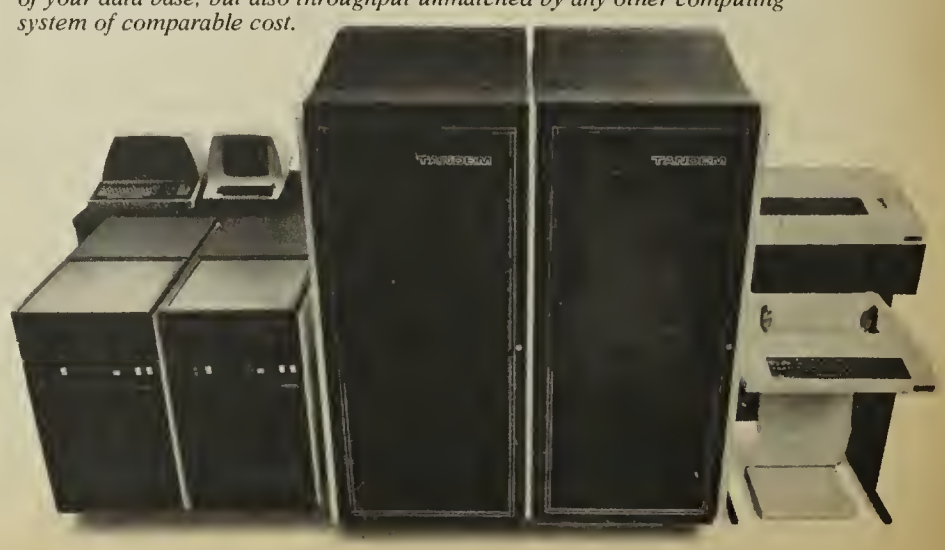
The four major "on-line" considerations.

When anyone is considering an on-line system, regardless of size, there are four primary points to consider. Throughput. Availability. Data Integrity. Transaction Protection. The system must be able to handle the job. It must be there when you need it. You must be sure of the integrity of your data base. And you must be sure you don't lose or duplicate a transaction. Even during a failure. No single processor system anywhere can provide that assurance. It takes a multiple processor system designed for the on-line environment, and Tandem is it.

For better throughput, spread the files.

We built the Tandem NonStop System with geographic independence of programs and files. They're handled automatically under Enscribe, our Data Base Record Manager. And instead of having one processor with one bottlenecking channel and a

The Tandem 16 NonStop System is composed of multiple, independent processors with dual redundant communications paths. The unique interaction between Tandem hardware and software assures not only continuous operation, and the integrity of your data base, but also throughput unmatched by any other computing system of comparable cost.



Career Project Extended

NOTRE DAME, Ind. — A University of Notre Dame program to stimulate minority students' interest in technical careers has been expanded and funded for a second year.

The program, which uses computer games and programming, received $58,064 this year from the Committee on Institutional Cooperation Plus/Midwestern Program in Minority Education to support its work with minority high school students.

In 1976, terminals were placed in several Indiana junior high schools; students communicated with Notre Dame's IBM 370/158 by telephone. The program has now acquired its own computers and been extended to two middle schools and a senior high school.

Designs Program for Vendor

Pupil Trades Tacos for Terminals

MINNEAPOLIS — Last summer, Bonita Heid waited on customers at a taco stand. This summer, the St. Cloud State University senior designed a computerized program to maintain a sequence of labels while and after a program is being debugged.

Heid was one of four St. Cloud students engaged in an experimental internship program between the Minnesota university and Data 100 Corp., a manufacturer of computer terminals based here.

For her work, the 21-year-old mathematics major received $4 an hour, up to 16 hours of college credit and a chance to work in a computer company while she's trying to decide on her career. "We goet three months to see whether we liked this kind of work," she said, "and they got three months to decide whether they liked us."

Apparently the company did. According to Michael DiPaolo, Data 100's product support manager and the person responsible for initiating the exchange, "we gained the services of four highly motivated people in a vital area — but one that's not always easy to recruit for.

"We always wanted to get at these software projects," he noted, "but our people have always been tied up with larger projects. With our 'new employees,' we finally had that chance."

Like Heid, the three other students — Jeff Schmitz, Bill Hagenbuck and Paul Aubrecht — are all seniors in the school's computer sciences program and will graduate within a year. "That makes them excellent prospects for these jobs later on," DiPaolo said.

For its part, St. Cloud is able to provide its computer sciences students with meaningful work experience. As Robert Johnson, computer sciences and mathematics professor, said, "We are pleased that the students are getting valuable hands-on experience and not just the dirty work."

processor system anywhere an "on line" environment.

fixed priority system, Tandem's NonStop System distributes the work and the files across multiple processors, multiple discs, and multiple channels. Enscribe controls the pattern and the flow for maximum efficiency. Because of simultaneous disc accesses, there's a dramatic improvement in response time. It's one of the performance benefits about a multiple processor system which you can't get on a single processor system.

Ease of programming, by design.

Historically, multiple processor systems have been a bear to program. Not with Tandem. Guardian, Tandem's operating system, lets you write your programs as usual. You can add more processors, or memory, or terminals as you need them. No need to rewrite programs. Ever.

And we make it easy to write the programs in the first place, with COBOL or with TAL, a powerful language designed for fast, flexible programming. The software development tools of this mini-based system rival those of far more expensive systems, and include NonStop operation, data communications, mirror volume capability, full file protection, screen formatting programs, and a host of housekeeping utilities.

When you're thinking "on-line," think in Tandem.

Which means think in multiples. Few, if any, "on-line" systems can be installed and forgotten. The number of transactions, the number of terminals on-line, or the number of applications programs to be run on the system keep growing. Most likely, all three will multiply.

Which is traumatic unless you've started with the one system on the market which can grow with you—even if the growth occurs during the initial configuration phase—without having to start all over again.

NonStop growth and NonStop protection, too.

Because the Tandem System was designed for NonStop operation in both hardware and software, it offers an extraordinary measure of protection against a failure in any processor, I/O channel, disc drive, or in the software. No other system offers this measure of assurance.

When a failure does occur in any segment of the system, its back-up counterpart completes the task, without a hitch. Since all programs are geographically independent, and the operating system both distributes and monitors all work-in-process, recovery from a failure is instantaneous. There is no restart; no backing up to a hopefully safe point.

The system monitors its own operations, performing all tasks in a distributed fashion across the multiple processors. Even when a CPU goes down, another CPU is immediately aware of the failure and picks up the task in process and completes it. No data and no transaction need ever be lost or duplicated. The integrity of the data base can be fully protected. It is truly unusual, but it's one reason why we say no single processor system anywhere can touch us in the "on-line" environment.

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Guardian: Operating System.

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Envoy: Data Communications Manager.

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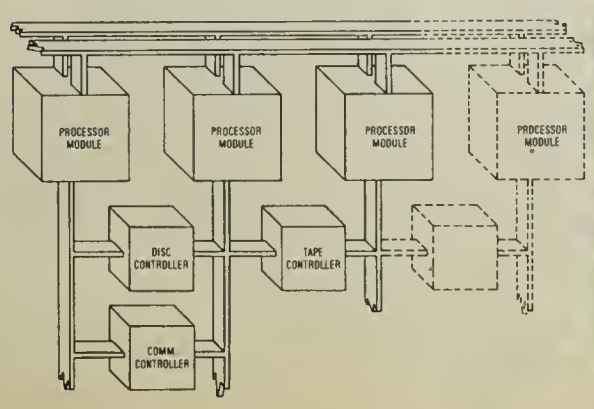
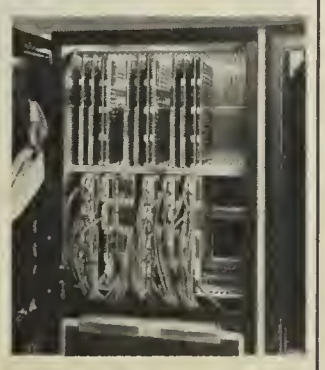
Photo and schematic show three processor modules with space for fourth module, interconnected to disc controllers, tape controllers and communications controllers.





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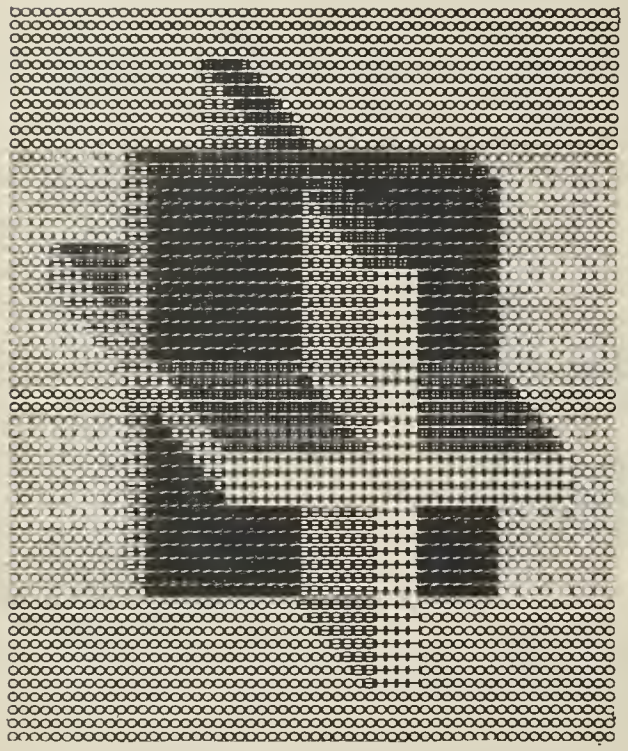


KUBUS-SERIE by Klaus Bassett, a professor at Grafischen Fachschule in Stuttgart, Germany. An example of a definitive series exploring programmatic variations of a square. (Courtesy *Computers and People*, August 1975)

By Nancy French
CW Staff

NEWTON — Is computer art Art?

The answer, oddly enough, is no, according to Edmund C. Berkeley, editor of *Computers and People*, a magazine that has sponsored a computer art exposition in its August issue for 15 years.

"All my opinions about computer art are expressed in my August editorial," Berkeley responded when approached by *Computerworld* for an interview.

Besides, he said, "I don't think it matters whether I like it or not, I think it's more important what ordinary people think about it." And ordinary people, according to Berkeley, don't find computer art very satisfying.

In his editorial, "Computer Art and the Eye of the Beholder," Berkeley contends people without any loyalty to the computer find computer art "boring" — "only avant-garde editors of computer books seem to want copies of the art now and then," he noted.

Why? Because of its "abstractness." Computer art fails to "represent common objects and scenes;" further, it fails to show objects portrayed "in their detail and historical perspective."

Finally, the artists don't overlay their "pictures" with any "representation of emotion, mood or artistic interpretation," Berkeley said.

"People understand and enjoy art far more when they can look at the entire scene and find many interesting and challenging things to observe. The basic quality of great pictures is that one can look at them over and over, and for a long time, and discover still more delight and interest — and 'beauty.' The beholder can say, 'I like that. It makes me think and dream. It speaks to my condition.'

"It seems to me that for a beholder, interest and delight in art depend on recognition of objects and scenes; richness of detail, history and impressions; all suffused by an artist's deft technique for conveying invisible emotion and feeling. Thus a rich collection of messages, intellectual and emotional, are conveyed from the artist to the beholder, and beauty becomes a joint enterprise for them both.

Do I hear an argument?"

Yes — from Grace Hertlein, art editor of *Computers and People* and editor of *Computer Graphics and Art* who "respectfully" replied to Berkeley's comments and also defended computer art — its status as an art form — and offered some suggestions for improvement. Hertlein, who describes herself as "an artist turned computer artist," is an associate professor in the Department of Computer Science at California State University in Chico.

"Edmund Berkeley is absolutely right that the beholder should be stimulated, moved and repeatedly moved, that we should discover more and more of interest delight and beauty in a work of art," she believes.

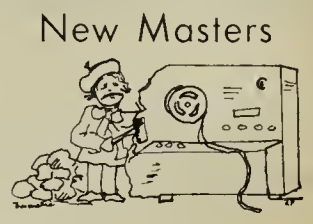
"But 'beauty' is an overworked word. We need to find new words. The drawings of Leonardo da Vinci are not beautiful, but they are moving, revealing and fascinating.

"Man will continue to find his face and his world meaningful in the future. Therefore these patterns of man and his world should be included more in computer art," she agreed.

However, Hertlein defends computer art as a "young" art form. "It has gone from an accidential happening, practiced by physicists and systems analysts, to become an art that is popular with many kinds of people" in about 15 years, she pointed out.

Computer art is characterized by "a great deal of pattern manipulation." Designs are input and varied "via transformations and randomizations" which result in "interesting visual patterns. These might make nice wallpaper or wrapping paper, but too often they are not exciting and moving enough to be considered as art," she said.

She also conceded that the types of designs input into the computer are often "aesthetically wanting." Too often one limited design is repeated topsy-turvy. As such it "tickles our senses briefly, but it hardly ever accomplishes more than this surface, brief pleasure," she explained.



"Often I see in print and exhibitions work that I would return to a first semester computer art student to develop more fully," Hertlein said.

But, is it fair to compare an art form that is only about 15 years old with art that is thousands of years old? Hertlein asked. Cave art goes back 17,000 years. If one chooses to disregard cave art, Egyptian and Mesopotamian art still date back as many as 4,700 years, she noted.

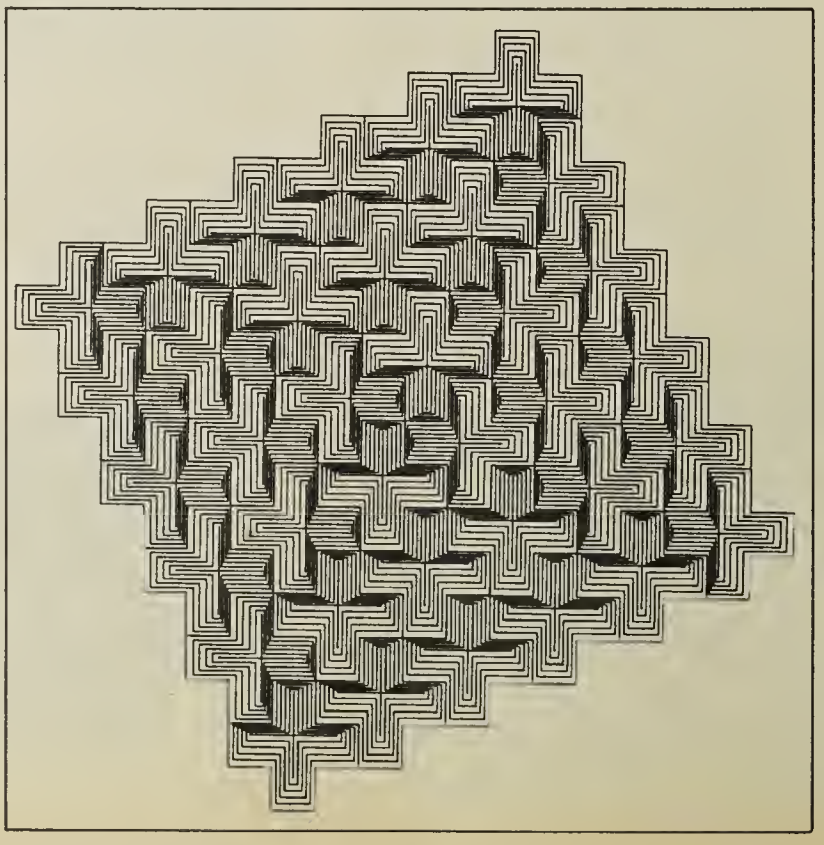
Further, "hundreds of thousands of artists have practiced Art, contrasted with a few hundred who are currently engaged in producing computer art," she added.

As for Berkeley's contention that computer art is "flat, and two-dimensional, made up of many lines, lacking solidity and lacking perspective," Hertlein agreed with his assessment and even called it "sound." Much computer art possesses these qualities because of the types of computer systems used to create them.

For example, she said, "point-to-point programming encourages linear, flat designs of a lean, minimal nature. Few systems have digitizers and tablets. Many graphic systems do not have a curve-fit routine and therefore forms are excessively angular."

Further, "a good proportion of graphic systems do not have a user-

ZUP TZE 33 by Paul Shao and Kenneth F. Dunker, professors at the Department of Architecture at Iowa State University in Ames, Iowa. An example of modular optical art, ideally suited to the computer and derived via a transformation algorithm. (Courtesy *Computers and People*, August 1977)



oriented 3-D routine for artist use," she added.

An Evans-Sutherland Frame Buffer system that allows the computer artist to literally paint colored computer art with dimension and solid-appearing patterns costs $250,000, she said. And few installations can afford such a system.

But there are other limitations, too, according to Hertlein. "Not all campuses and installations have generous computer graphics systems. Many have only printout capacity."

Furthermore, programming languages for computer art "are not highly developed, and often they are not transportable," she pointed out. "An ideal graphics language as such does not exist, but it might someday."

In computer science "the name of the game is to make a device or system do what it was not intended to do. Artists are becoming more knowledgeable about system limitations, and they are becoming more knowledgeable about programming and about art in general," she said.

Hertlein agrees that "representational" art, which features recognizable patterns from the world of man and nature rather than abstractions, is more satisfying, but often commonplace to the point of being boring. She defends the forms resulting from science and mathematics as "equally viable" as representational forms.

"Since mathematics and science are part and parcel of computer art, the innumerable forms from these disciplines are highly desirable as design sources," she argues.

Hertlein, in contrast to Berkeley, feels "a special delight in perceiving the instantaneous moment." The historical rendition of an event such as the eroding of a mountain, for example, is "another pleasure."

The prints of the famous artist Maurice Escher are an example of both. "Perhaps we need to be more open about deciding what computer art should and should not be lest we follow the example of manual art with its diverse, fashionable dogmas," she said.

Hertlein doesn't disagree the point that her fascination with computer manipulation of numbers and images is the basis for her fascination with computer art. "We are like the doting parent or teacher" — doting on computer art because we are computer people, she admitted.

"If we were to see the same art accomplished manually, we might find it quite uninteresting. We may be too fond of the computer and whatever it can do," she added.

Berkeley expressed little fondness for computer art that looks like something "a man could do." He did agree, however, that computer art that is too complex for a man to do manually can be interesting and attractive.

But computer art is often better than people think, according to Hertlein. More than 90% of computer art illustrations found in texts and even in catalogs and brochures for computer art exhibitions are printed in black and white because of cost. Without seeing the originals in color "we cannot fully know the work of art."

Another factor militating against the acceptance of computer art as Art is the general "antitechnology movement in this country," according to Hertlein.

"Because of the lack of exposure to computers and technology itself, many individuals believe technology debases mankind and art," she said, but "because of our experience, we know that it is the purpose, the method of using technology, that makes the difference. The person behind the computer is very important.

"As an artist turned computer artist, I have encountered a great deal of genuine animosity from manual artists. But I have encountered a great deal of encouragement from computer people."

As an example, Hertlein described an incident that occurred while she was hanging an exhibit of works by 250 invited international computer artists in a university gallery in Los Angeles. The works were large, well matted and framed; the majority were in color.

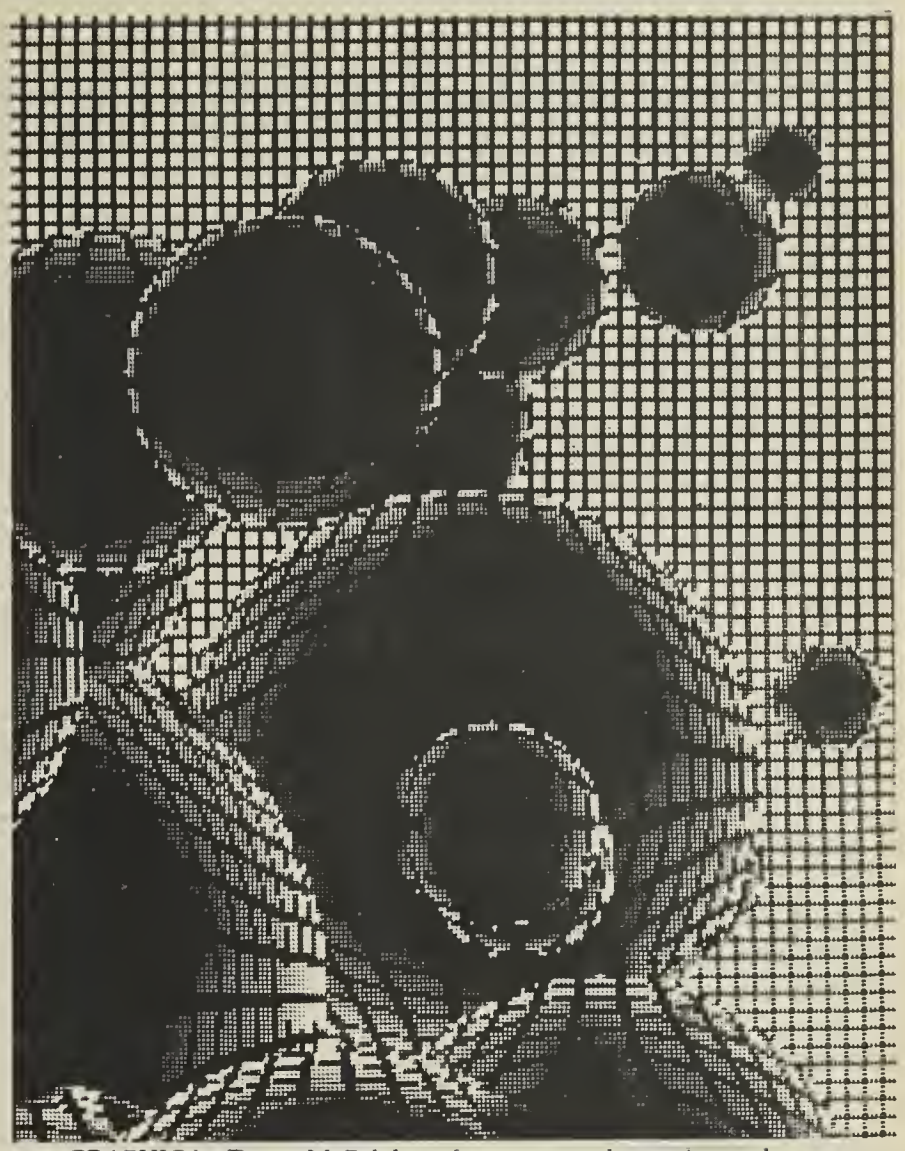
People were already gathering, and "words of praise flooded the gallery. As we completed our work we put up a large sign: 'International Computer Art.' It caused a furor. The word 'computer' brought forth damning comments, replacing the accolades volunteered a few minutes earlier," she said.

"As visual arts chairman, I remained behind to informally lecture and answer questions about art. However, no explanations, no comments could undo the apparent prejudice of the beholders."

Only when computer art is displayed in exhibitions and galleries with acceptance of the "computer" as an art medium, just as watercolors and oils are accepted, will computer art be evaluated fairly, she said.

The potential of computer art to emerge as a full-blown accepted art form is clear." I believe the breakthrough of computer art as a popular art form is likely to occur within the next years," she said.

Is This Art?



GRAPHIC by Duane M. Palyka, a former research associate and systems programmer at the University of Utah in Salt Lake City, now of New York. From the "Bubble" series in which the artist explores two-dimensional space wth a three-dimensional illusion. (Courtesy *Computers and People*, August 1975)

FALLING MAN by Kerry Jones, a systems engineer with Datapoint Corp. in Nashville, Tenn. A tour de force programmatically, and a social commentary on man and technology. (Courtesy *Computers and People*, August 1976)

New York, Pacific Stock Exchanges Plan Link

By Edith Holmes
CW Staff

NEW YORK — The New York Stock Exchange (NYSE) and the much smaller Pacific Stock Exchange last week announced their intention to electronically access each other's trading floors.

In the meantime, representatives of the Pacific and four other regional exchanges — the Midwest Stock Exchange in Chicago and those in Boston, Philadelphia and Cincinnati — plan to meet in Chicago this Wednesday to discuss the expansion of their own intermarket hookup.

A link between the Pacific Exchange — which had a recent total weekly average of 791,000 shares — and the "Big Board" — with its average daily volume of 22 million shares — would allow dealers to match a buyer in California with a seller in New York, according to an NYSE spokesman.

No start-up date has been projected for the NYSE-Pacific link, and it is not clear whether traders and their customers would be charged for the use of the service, the spokesman said. "An awful lot of detail has to be fleshed out," he added.

The hookup between the "Big Board" and the Pacific Exchange, however, could "evolve into the key element of the national market system called for by Congress," NYSE chairman William M. Batten said.

Batten invited the other regional stock exchanges to join in the link, but the regionals' own system could eventually provide competition to the NYSE plan.

Business Increase Expected

The Pacific Exchange expects the New York-Los Angeles hookup to produce a sharp increase in business for the Pacific Exchange, a stronger competitive position for California-based regional brokerage firms and benefits for investors who would gain access to a broader market, Pacific chariman Edward W. Wedbush said.

It is uncertain whether the Securities and Exchange Commission (SEC) would have to approve the plan, however. An SEC spoksman said the commission will study the pact to assure it is consistent with federal stock trading laws.

At the Chicago meeting on Wednesday, Regional stock exchange officials will take up the expansion of their limited system operated by Weeden Holding Co., parent of stockbroker Weeden and Co.

Weeden has linked the Pacific, Boston and Philadelphia exchanges in a system called "wham" for Weeden Holding Automated market.

Listing 50 stocks and allowing interexhcnage trading, Wham matches buy and sell orders on a first-come-first-served basis and doesn't allow dealers to request that their transactions be made on a specific floor, a spokesman said.

On Wednesday, Weeden will propose that other regionals be allowed to join the system, renamed RAM for Regional Automated Market. The company hopes to make this expanded system operational with a limited list of stocks by October.

Weeden hopes its system will become the single national stock exchange hookup. "Ultimately, all markets could be linked up through RAM," the company's spokesman said.

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Cornell Gets NSF Grant For Chip Research Facility

WASHINGTON, D.C. — The National Science Foundation (NSF) has given Cornell University five years and $5 million to find out how much more memory can be packed onto a chip.

The grant provides for the establishment of the first national facility for research on electronic devices with dimensions of less than one micro — about one sixtieth of the diameter of a human hair — and for studying the fundamental properties of the materials used in their fabrication, according to an NSF spokesman.

To be called the National Research and Resource Facility for Submicron Structures, the laboratory will look for better ways to produce tiny patterns that can be incorporated into a wide range of electronic devices. Such techniques will ultimately be used to improve communications, increase computer capacity and make possible advances in the biological sciences.

Dr. Joseph Ballantyne, professor of electrical engineering at Cornell, is directing the initial planning for the facility. He said the technology planned for development in the new laboratory will allow researchers to inrease by 10 times the density of components in an integrated circuit.

In addition to its use in the expansion of the technology in this area, the laboratory will also be employed to train graduate students, engineers and scientists in the field and to stimulate research on submicron structures in physics, chemistry, chemical engineering and related fields, the spokesman said.

Alexander Named HRIS Director

WASHINGTON, D.C. — Boyd L. Alexander, who has served since March as acting director of the House of Representatives Information Systems (HRIS) — the computer and information systems support arm to the House of Representatives — has been appointed the organization's director.

Alexander came to Capitol Hill from the Office of Management and Budget's (OMB) Information Systems Division. He replaced Dr. Frank Ryan, who left the position as head of HRIS to become Yale University's athletic director.

Another former OMB Information Systems Division staff member, Franklin S. Reeder, has been named deputy director of HRIS.

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Now Used to Print Tickets

System Expected to Expand Stadium Services

By Jeffry Beeler
CW Staff

CHICAGO — They might have to wait a while, but managers at Chicago Stadium expect an automated ticket-printing system to eventually expand their range of customer services and cut their production expenses.

Because stadium officials installed it only last October, the minicomputerized system has not yet had a chance to yield either of its expected benefits, box office manager John Stroth explained. "It's a new system, and we're still making design changes in it," he said. "It usually takes a year or two to get everything on a new system working correctly."

But when the system finally does become fully operational in a few months, stadium officials will be able to maintain mailing lists, notify customers of upcoming events and perform other functions and services that previously had been beyond their capabilities, Stroth said.

The system will also allow stadium managers to trim their ticket-printing costs, although Stroth admitted "it's a little too early at this point to estimate exactly what the savings will be."

More Than Enough

When they relied exclusively on outside services for their printing needs, Stroth and his colleagues had to order a full complement of tickets for every event they hosted. Unfortunately for them, many of the events that take place at Chicago Stadium — hockey games, ice shows, rock concerts and the like — draw less than a full house, so, in some instances, stadium officials were forced to buy more tickets than they could sell.

Today, with the minicomptuer system, they buy some of their tickets from Ticketron, the New York-based supplier, and then print any additional tickets in-house as the need arises. As a result, they order only as many tickets as they can sell, Stroth explained.

Before they installed their own printing system, Chicago Stadium managers obtained their customer tickets from a local commercial printer. Although they had no complaints with the printer's service, they concluded that an in-house ticket-printing system, with its ability to perform many extra functions, "was the way to go in the future," Stroth recalled.

Leased from Ticketron for $35,000 a year, the desk-sized computer system manages season tickets, changes customer seating arrangements on request and does billing and promotional mailings in addition to its primary job of printing tickets. Except for the forms cutter, the stand-alone Ticketron 2000 system consists almost entirely of Control Data Corp. hardware, including a 32K-byte Cyber 18 central processor, a Model 1811/1 CRT terminal and a Model 1827/30 line printer.

After the system becomes fully operational, Stroth and his associates plan to replace the configuration's two 250K-byte floppy disk drive units with a much larger capacity drive. This improvement will allow Chicago Stadium managers for the first time to perform several DP tasks simultaneously, the box office manager predicted.

They will be able, for example, to print tickets for one stadium event and at the same time change seating assignments for a subsequent attraction. The existing system, in contrast, can't perform any additional DP tasks while it's printing tickets.

Topic of Distribution Set for HIS Seminars

PHOENIX — Honeywell Information Systems, Inc. will conduct two seminars on the distributed environment and networking for executive and technical personnel in the user community.

The product-independent seminars include a management session of two days and a 10-day session for those with extensive systems experience.

An introductory seminar for upper and middle management will be held Nov. 9-10 in Boston. The tuition is $250, which includes a workbook.

The 10-day distributed environment session is scheduled for Dec. 5-16 in Phoenix. Tuition is $1,250 including workbook, materials and computer time.

Further information is available from Hal B. Becker at HIS, P.O. Box 6000, M.S. K-99, Phoenix, Ariz. 85005.

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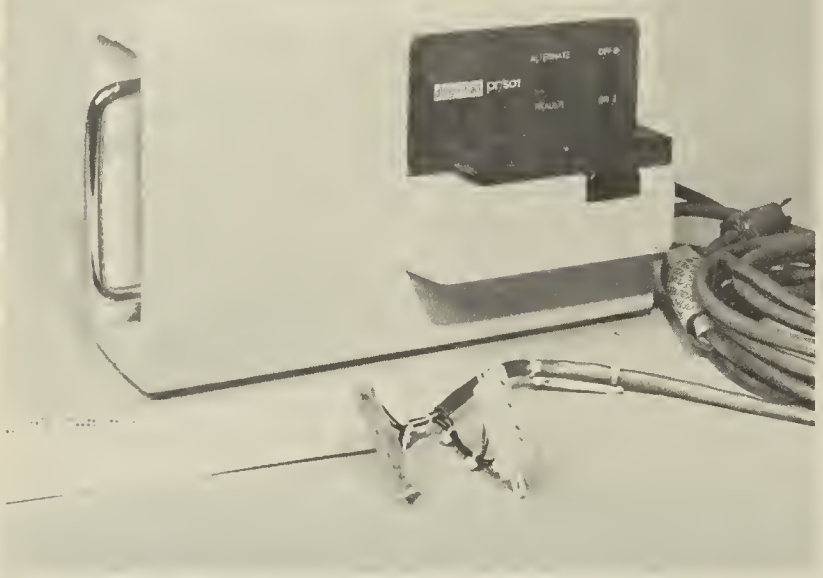

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Scholarship Aid Program On Small System Itemizes Prospective Funds Sources

By Esther Surden
CW Staff

MANCHESTER, N.H. — Where to get the money to send the kids to college is a common concern of parents today. A nonprofit program run on a small business system at New Hampshire College here is helping to alleviate this burden.

The program is the combined effort of New Hampshire College, which has exclusive processing rights, the Citizens Scholarship Foundation of America, Inc. (CSFA), which is developing the files, and the College Entrance Examination Board, which is responsible for quality control and dissemination of the information to the students, according to Joseph F. Phelan, executive director of CSFA.

The Ford Foundation is also involved via a three-year grant totaling $95,982.

Under the scholarship aid program, an applicant from any of the New England states, Indiana or Minnesota can receive a listing of at least 10 sources of funding for $10, according to William A. Hunzeker, assistant professor at New Hampshire College.

The program is in the process of being expanded to include Illinois, New Jersey and Texas and is expected to cover Michigan, New York, North Carolina, Ohio, Pennsylvania and Virginia in the near future.

The program began in 1972 on an NCR Century 100 that handled all of the college's educational and administrative needs. The growing use of the system for special projects prompted the college to upgrade to an IBM 3/-10, which has since been upgraded to a 3/15D.

"At the time we began, CSFA asked several computer companies if this particular thing could be done. Two didn't answer the request for proposal, another company came in with a high bid and IBM said it was nearly impossible to do," Hunzeker recalled.

CSFA then allowed the college to tackle the project. Hunzeker challenged some students to do it and they came up with a program for the NCR Century 100.

The program "worked reasonably well, although it served only the state of New Hampshire and had a very small data base of about 500 sources of aid. It took the machine about a minute and a half to two minutes to put out a list that averaged about 13 sources of aid for each applicant," he said.

When the college switched from the NCR to the IBM system, it also tried to convert the programs. It found, however, that because of the file structure the same functions that had taken a minute and a half to two minutes on the NCR machines now took five minutes on the IBM system.

"But we did such a low volume it didn't make a lot of difference," Hunzeker said.

In 1974, CSFA contacted the college to see if the program could be expanded on a national level. The college rewrote the software and upgraded from the 3/10 to a 96K System 3/15 and changed from Model 5444 disks to 3340 disks. Just last month it upgraded again to the 3/15D.

To obtain the data needed for the scholarship matching, CSFA employs qualified part-time summer help to do actual field work that includes canvassing high schools and colleges, interviewing scholarship sponsors and compiling relevant data.

All input is prepared on diskette on an IBM Model 3741 key entry unit. The source document was designed to be transparent to the person filling it out. A coder goes through his computer-generated code book and assigns appropriate codes to the particular application form, reads from the application form and inputs onto the diskette, Hunzeker said.

"We are going to get away from this now," he noted. When the College Board sends out the application, it will effectively be a code book and "it will make the student do the lion's share of the coding."

The college plans to modify the system to use optical scanning as volume increases.

Zip Code Method

A "sophisticated" program is used to find the members of the data base that meet a particular student's qualifications, Hunzeker said.

"One of the primary requirements for printing an award is geography, so I use the Zip Code method of searching through the data base. I actually have two data bases. The programs split the information entered on diskette into two sources and there is one data base, containing nothing but requirements, that is specially coded," he said.

The requirements data base is searched in a Zip Code order starting with the local level because that's where the student has the best chance of getting funding, he indicated.

"The computer effectively has been programmed to selectively search. Some glitches in the system force it to learn better ways of searching as it goes along," he stated.

The search now takes 15 seconds, including the printing of 20 sources, he claimed.

The system is presently handling about 5,000 students, but has the potential to handle 1,000 a day with "no trouble," he added.

World Bank Supports Colombian Project

WASHINGTON, D.C. — The World Bank here has loaned $60 million to Colombia to expand its telecommunications facilities.

Colombia's Empresa Nacional de Telecommunicaciones (Telecom) hopes to improve telephone service to small towns and rural areas by 95,000 lines, connecting approximately 75,000 additional subscribers to its communications network.

Costing $167.7 million, the project will also involve the installation of microwave radio and multiplex equipment to increase circuit capacity by about 8,800 internal long distance circuits, connecting 2,200 rural communities to the telephone system.

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Whither the Weather? Model Might Explain

By Jeffry Beeler
CW Staff

BETHLEHEM, Pa. — Scientists here are using a computer model of U.S. wind patterns to try to find the cause of the recent unfavorable turn in the world's weather.

Developed by a Lehigh University research team, the model could help explain U.S. weather aberations like last winter's record-breaking low temperatures and the prolonged drought that has parched many of the western states.

The computer simulations also could lead eventually to improved short- and long-term weather forecasts and yield knowledge about warming and cooling trends in the earth's climate.

Scientists disagree about the long-term outlook for the world's weather. Some meteorologists contend that recent extremes in the world's weather signal a gradual cooling in the planet's temperature and the onset of a new ice age.

Other meteorologists argue that the slow build-up of atmospheric carbon dioxide from auto and factory emissions will create a "greenhouse effect" that will raise the earth's temperature enough to melt the polar ice caps and flood low-lying coastal regions.

Data provided by the computer simulations here could help reveal which of these bleak predictions, if either, is right.

The research, supported by a two-year National Science Foundation grant, is being conducted by Doctors Alister Macpherson and Peter Hilton, professor and associate professor, respectively, of mechanical engineering at Lehigh University. Dr. Melvin Shapiro of the National Center for Atmospheric Research in Boulder, Colo., is assisting the project.

Macpherson and Hilton have focused their research on the north-to-south shift and other fluctuations in the polar jet stream, a high-velocity current of air that flows from west to east around the world at a latitude roughly coinciding with Boston, the Great Lakes and Seattle.

For several years, the seven-mile-high current of air had shifted northward and brought relatively mild winters to the eastern half of the country. Last year, however, it moved suddenly and inexplicably south and sent winter temperatures plummeting to record lows.

By studying the jet stream, Macpherson and Hilton hope to learn how the phenomenon affects long-term global weather patterns, how it spawns weather fronts and how local meteorological disturbances like severe storms affect its stability. They also hope their work will reveal the cause of the jet steam and answer other basic meteorological questions.

"If we knew where the jet streams come from and what causes them, we'd be 80% along the way toward a good five- or six-day weather forecast," Macpherson explained.

Output Plotted

To achieve these benefits, Macpherson and his associates devised a computerized world model that makes 12-, 24- and 48-hour weather forecasts based on theoretical meteorological data like wind velocity and barometric pressure readings, which the researchers feed into their 128K Control Data Corp., 6400 CPU.

The results of the computer's predictions are generated on two flatbed plotters — a California Computer Products, Inc. Calcomp 563 and a Calcomp 565 — in the form of a map section overlaid with symbols like lines of constant temperature and pressure.

The researchers' configuration also incorporates four CDC disk drive units — two Model 844/21s and two Model 844/41s.

Without some sort of computer model, conducting a sophisticated study of the relationship between jet stream activity and weather conditions would probably be impossible, Macpherson said. He regards improved weather forecasting as the chief benefit of using a computer model in studies of the polar jet stream.

Meteorologists rate the accuracy of their weather forecasts with a standard dubbed the "skill score." "If, for example, weather forecasters predict half an inch of rain and three-quarters of an inch falls, they give themselves 70 points," the mechanical engineering professor explained. The same standard also applies in forecasting wind speeds and other common weather variables.

When predicting weather by hand, meteorologists average a skill score of about 60%, Macpherson estimated. With the Lehigh University computer model, by contrast, the researchers typically achieve a 70% rating.

"The computer model we have developed has improved weather forecasting accuracy by about 10%," he added.

North East CMG Sets Meeting Next Week

BOSTON — How to present performance data to management will be one of the topics covered at next week's open meeting of the North East Computer Measurement Group (CMB), according to acting chairman Jeffrey Buzen of BGS Systems, Inc.

The all-day session will take place here next Monday, Sept. 19, at John Hancock Institute, across the street from Hancock Tower.

There will be a $2 registration fee and anyone is welcome. Other details are available from BGS Systems, P.O. Box 128, Lincoln, Mass. or from Buzen at telephone number (617) 890-0000.

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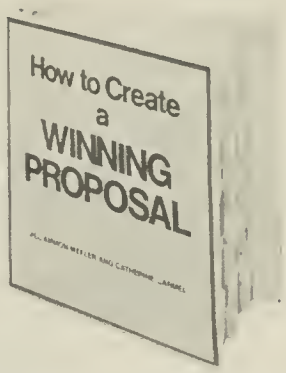

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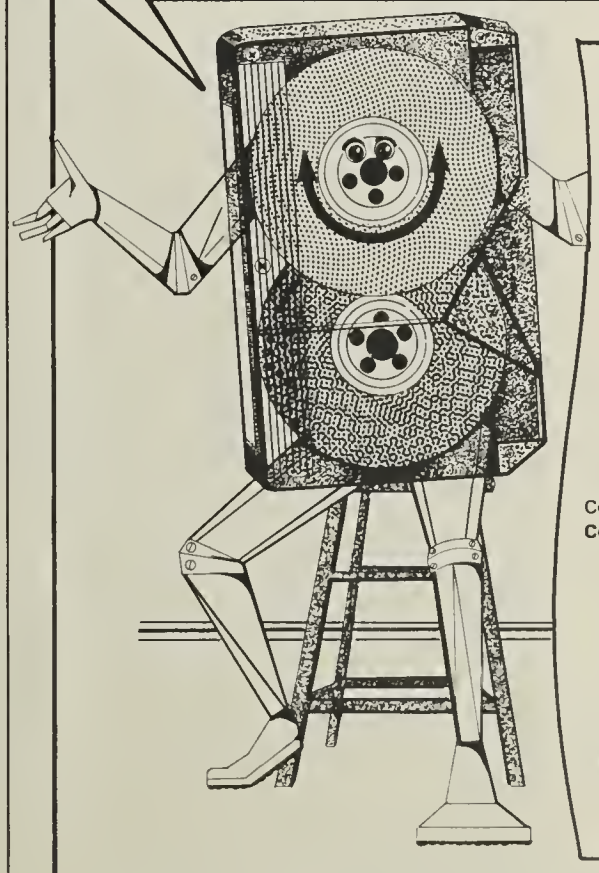

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Programming Course Uses Hand-Held Unit

By Denise Petski
CW Staff

DALLAS — High school students can soon be taught computer programming with a hand-held calculator through a course introduced by Texas Instruments, Inc.

Developed by the University of Denver Mathematics Laboratory, the course is designed for students with no prior knowledge of programming techniques or previous experience with hand-held programmable calculators.

The course format allows a teacher to utilize the materials with individual students, small groups or an entire class. Sections of the course may be used to enhance mathematics or science classes, or the entire package can stand alone as a separate mini-course in programming, according to a company spokesman.

The course will help prepare students in high school and beyond who are interested in careers as computer programmers, since the essential concepts and techniques used in programming calculators are directly related to those used with larger DP systems.

The hand-held calculator is an ideal learning tool for programming because it is immediately available to teachers and students who otherwise would have to wait, after writing programs, for access to a larger computer, according to the company. Also, initial and continuing costs for a computer-based course could be much higher than for one that uses calculators, it added.

The course emphasizes the "natural side" of programming, covering techniques which involve logical thinking and organization of problem solving steps in a straightforward order.

Lesson materials were designed to move students into simple, straight-line programming quickly. Students then proceed to program techniques involving conditional and unconditional transfers, loops and subroutines.

Included with the course is a teacher's guide setting lesson objectives and details, with additional suggestions on the adaptation of programmable calculators to the classroom.

The course will be available this fall through authorized dealers. Texas Instruments, Inc. can be reached at P.O. Box 5012, Dallas, Texas 75222.

National Fire Data Center

WASHINGTON, D.C. — Seven states will begin reporting their fires to the National Fire Data Center at the National Fire Prevention and Control Administration (NFPCA) within the next year.

Awarded assistance grants by the Department of Commerce, the states will use the monies to establish or adapt statewide fire data systems, an NFPCA spokeswoman said.

Delaware, Iowa, Michigan, Minnesota, Rhode Island, South Dakota and West Virginia will divide $112,000 in NFPCA assistance money, using these funds to help develop and operate statewide fire incident reporting systems. The data systems will be developed or adapted to be compatible with those in other states, the spokeswoman stated.

Local fire departments will contribute their fire incident and casualty report information to their states. Statewide summaries of this data will be prepared, and participating local jurisdictions will receive feedback reports.

The center will use the data to produce national estimates and develop a data base for answering information requests from government, industry and the public.

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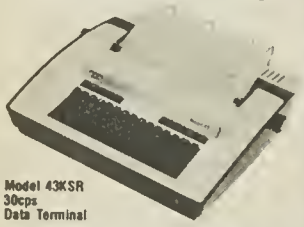

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DP Helps Find Way of Feeding Bangladesh

COPENHAGEN, Denmark — Researchers used computer technology in planning a major new grain distribution network in Bangladesh to help feed that nation's rapidly growing population of more than 75 million, which is crowded into an area smaller than the state of Iowa.

To do so, Operations Analysis Corp. (OAC), a worldwide operations research consulting organization based here, called on Control Data Corp.'s Cybernet Services to conduct feasibility studies on the physical and economic planning of the new grain facilities project.

OAC's objective was to find the best system for the distribution and storage of 15 million tons of grain and to ensure that the grain comes from the production areas and goes to urban areas.

"We wanted to be certain that the new facilities integrated with existing facilities, provided a complete system with minimal capital, operating and transportation costs," Bjorne H. Sorensen, OAC project manager said.

Transportation Problem

Transportation was one of the main problems because many railroads and roads were destroyed in the civil war which ended in 1971. To help beat this problem a task force of experts went to Bangladesh and gathered information about such factors as transportation, costs of building different types of structures, distribution of production, distribution of consumption and entry of imports.

Seventy locations suitable for building storage facilities were selected. Each location had crossroads, railroad junctions or rivers; sometimes all three were available.

In addition, different kinds of storage facilities could be built: steel or concrete silos, flat storage spots or bag-handling facilities. Some existing facilities also could be rehabilitated.

"If your only decision problem was to build or not build at each of these 70 locations, you would have 2^{70} possibilities according to Sorensen. "That is a huge problem."

Fixed Flow Program

In Copenhagen, the analysts chose a fixed flow program developed by CDC to set up their problem. Output from the program showed how much grain should be shipped from each production or import location to each of the potential storage sites and from there to each demand point.

OAC then drew a map showing what the flow should be from the different parts of the country and then recommended the kind, size and location of storage facilities, based on mathematical calculations processed through the Cybernet center here. Its recommendations then were used to establish the distribution network in Bangladesh.

OAC began using Cybernet Services in 1971. Initially, it bought time and developed its own software programs. Today, the company uses a number of mathematical programming, statistical analysis and structural testing programs available through the Cybernet applications library.

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EFT Commission Gains FTC's Foer

WASHINGTON, D.C. — Albert A. Foer, assistant to the director of the Federal Trade Commission's (FTC) Bureau of Competition, has been named a commissioner on the National Commission on Electronic Fund Transfers (EFT).

Foer has been working closely with the commission since its inception, according to FTC Chairman Michael Pertschuk. In addition to possessing an antitrust background, he is known as an expert on privacy issues and has published a study entitled "The Personal Information Market: An Examination of the Scope and Impact of the Fair Credit Reporting Act."

Foer will be a member of the EFT Commission's committees on sharing, competitive impact and consumer issues.

The commission is an independent advisory agency which must report to Congress and the President this fall on its findings and recommendations concerning the development of EFT systems.

On-Line Analyses Defuse Tokyo Traffic Jams

By Ivan Berenyi
Special to CW

TOKYO — A large on-line real time computer system is being used here to analyze traffic flow and prevent the kind of traffic jams that have come to give big cities a bad name.

More than 2,900 traffic lights here have been brought under computer control to date — a number that has doubled in the last 12 months; according to Osamu Nakamura, chief of the Tokyo Metropolitan Police Department's Traffic Control Division.

Computer analysis of traffic flow enables early action to defuse potential jams by reordering the sequence and duration of traffic light changes, according to Nakamura.

Data Collection

The traffic flow data is gathered on-line from more than 3,200 ultrasonic vehicle detectors installed at roadsides throughout the city center. More detailed information at peak-flow pressure points like the famous Ginza or Akasaka Mitsuke intersections comes from 19 closed-loop television cameras, phone calls from officers on the beat, radio-equipped patrol cars and rush-hour helicopter surveys.

All the incoming data is analyzed by a Nippon Electric Neac 2200 Model 375 computer, with 524K-byte core capacity. In the traffic control center an illuminated map of the city center shows in color-codes the changing status of the city's traffic — white for "good flow," orange for slow-down and red for full-scale jam. Visual display units give more detailed information, such as the precise flow of traffic at any one intersection.

Control of the traffic lights is handled by six 64K Neac 3200 process control minis, communicating with the central processor through two 32K Neac 3100 front ends.

Continuous Expansion

"The system is being expanded every year in terms of the area covered, the number of computers installed, intersections controlled, vehicle sensors used and TV cameras mounted. Two of the Neac 3200 computers were installed in the last year alone," Nakamura explained.

The system is a merger of two former traffic services — the 10-year old Traffic Information Center, which used to gather data manually from police officers pushing buttons in police boxes to represent traffic flow; and the Computerized Signal System, set up in 1969 when the first Nippon Electric computer was installed.

The Traffic Information Center data was previously processed by two Technomaster control processors made by Matsushita Control Industrial Co. These have now been discarded, and the Matsushita Macc-7 computer complex, earlier dedicated to coordinate traffic lights along certain routes as a slave to the computerized signal system, was phased out.

Fight Continues Over DP Taxes In Oregon, R.I.

The fight against software taxation in various forms continues in Oregon and Rhode Island.

Oregon Governor Robert Straub has signed into law a bill that exempts software from property taxation by defining it as intangible personal property, according to a spokesman in the tax research bureau.

The new law will be effective Oct. 4. The state has no sales tax, he added.

Petitions in R.I.

In Rhode Island, Puritan Life Insurance Co. has filed two petitions in its efforts to eliminate a sales and use tax assessment for the years 1971 to 1977 on software, according to William W. Fitzgerald Jr., assistant counsel.

Puritan is seeking rulemaking procedure that would eliminate an administrative rule that says software should be taxed as tangible personal property, he indicated.

The firm has also filed a request for a hearing on its own assessment, but has asked that the rulemaking procedure be held first, he said.

The petitions were filed with the state tax administrator.

Distributed Confusion

There are almost as many approaches to distributed processing as there
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At Hewlett-Packard, we've worked out several ways to simplify the problems of putting your computer power where the work is. Our systems can help you make the most of your system, let you computerize many functions you're now doing manually, and still give you central control through links to your big computer. And they're so versatile that they can adapt to future changes in distributed data processing.

This all-around performance makes the HP 3000 an ideal departmental computer. You can dedicate it to solving a wide range of problems such as order processing, inventory control, cost accounting and materials requirement planning.

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Our system is also easy to expand, either within a department or into a complete network of computers that share information and programs.

Putting an entire network of computers at your fingertips.

We've developed new software, DS/3000, that turns a series of HP 3000s into the simplest, most functional network available today. You can sit down at a terminal and use the programs, files and data in any interconnected HP 3000. You don't need a special program to do it. Simply identify the computer you want to talk to and you're on-line.

With the same ease, you can shift programs and files from one HP 3000 to another. And you can do local and remote processing at the same time.

Imagine how much faster remote sites can get accurate, up-to-the-minute information this way than they could by depending on the overworked central computer!

How a small computer handles big computer jobs.

The HP 3000 has versatile executive software that manages all the computer's resources. Advanced design gives it the speed and power needed to handle more jobs more quickly than comparably priced computers. (Our U. S. prices start at $110,000.)

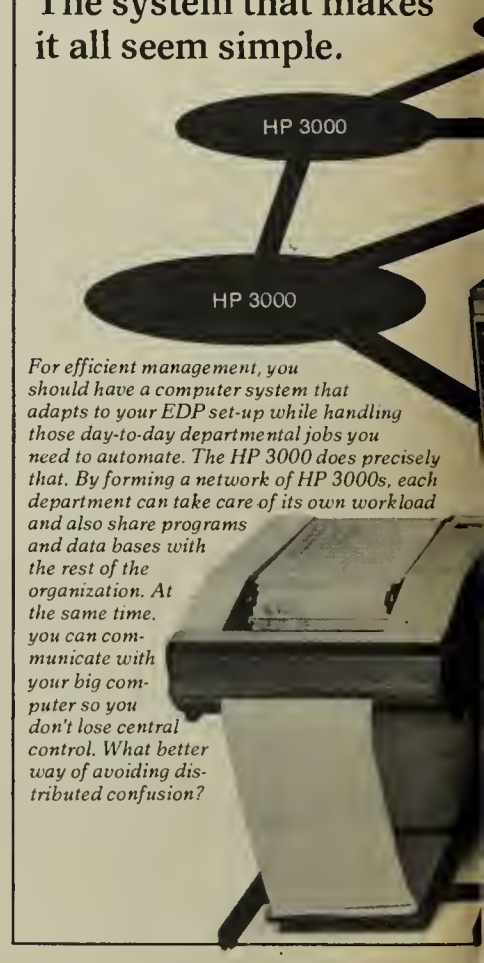
While you're getting information from the computer on one of the terminals, the system can be running batch programs.

You can also use as many as six "big computer" languages, run large programs on our small system and develop software quickly and inexpensively. (A very important consideration when you look at the climbing costs of programming.)

The executive software is so advanced that it will remain the heart of our computers for years to come. So you can keep adding to your system without having to throw your old programs out the window.

And the built-in flexibility of the HP 3000 helps you stay up with all the latest trends, no matter what direction distributed data processing takes in the future.

The HP 3000: The system that makes it all seem simple.



For efficient management, you should have a computer system that adapts to your EDP set-up while handling those day-to-day departmental jobs you need to automate. The HP 3000 does precisely that. By forming a network of HP 3000s, each department can take care of its own workload and also share programs and data bases with the rest of the organization. At the same time, you can communicate with your big computer so you don't lose central control. What better way of avoiding distributed confusion?

47703HPG5

But Agencies Call It Premature

Senate Gets Bill for Earth Resources System

By Edith Holmes
CW Staff

WASHINGTON, D.C. — A bill that would establish an earth resources and environmental information system has been introduced here by the Senate Subcommittee on Science, Technology and Space and is under study by the Carter Administration.

As presently designed, the bill — S. 657 — would make data about the earth obtained by satellites available to the private sector, a spokesman for the Senate Committee on Commerce, Science and Transportation said.

During five days of hearings held this summer, the agencies that would be charged with responsibility for such a system — the National Aeronautics and Space Administration (Nasa) and the Department of Interior — argued that an earth resources and environmental information system for the public is premature and surrounded by too many uncertainties, the spokesman stated.

OSTP Hesitant

The Office of Science and Technology Policy (OSTP), headed by Dr. Frank Press, science advisor to the President, also expressed its reluctance to serve as the coordinating mechanism for the information system, he added.

Other witnesses in and out of government who appeared before the subcommittee, however, indicated they would be enthusiastic users if Congress would establish the system, the spokesman said.

Press has organized an interagency working group with Nasa and Interior representatives to consider the feasibility of the system and the public's readiness for it.

Awaiting the interagency group's report, the Senate Subcommittee considers S. 657 a "vehicle for opening the subject up" and would like to draft a bill that would receive Nasa, Interior and OSTP support, the spokesman said.

"Our whole purpose was to get the executive branch to look at the possibilities of this information system in more than a fleeting way," he stated.

He stressed that when all views are heard, Nasa may not be in charge of the operational end of the system — launching and maintaining the satellites — while Interior handles the distribution of the information collected.

While S. 657 focuses particularly on the Landsat earth satellite program, the information system established could well include data collected by any number of application satellites. As an example, the subcommittee spokesman cited Seasat, a satellite that will be launched next year to monitor the oceans, providing valuable fishing and weather information.

Not only has the time come for this data to be publicly available in this country, there is a need for it internationally, he stated. The U.S. might find such an information system a valuable offering to the international community at the conference on science and technology for development which the United Nations plans to hold in 1979.

SCDP Relocates

MEMPHIS, Tenn. — The Society of Certified Data Processors (SCDP), formerly located in Hudson, Mass., is now headquartered here.

Its address is Suite 532, 2670 Union Extended, Memphis, Tenn. 38112.

The new office, managed by SCDP member Thomas Briggs, is expected to provide better service and decrease costs to SCDP members.

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Your big computer has data base management to consolidate related information into easily accessible files. This capability is just as important at remote sites.

It allows your key people to call up the facts they need instantly, and get them in an easily understandable form without wading through reams of paper.

The HP 3000 has an extremely effective data base management capability. With its help, the computer will generate forms, titles, page and column headings, data sorted by categories, subtotals, totals and averages. And, through DS/3000 software, you can call up any HP 3000 data file in your network.

Data base management on the HP 3000 has proven so efficient that it was recently named to the Datapro Software Honor Roll, placing it among the 38 top software products in the country.

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So if you want to take the confusion out of distributed processing, now and in the years ahead, call your nearest Hewlett-Packard office listed in the White Pages. Ask for a Computer Systems representative. Or write for more information to Bill Krause, Hewlett-Packard, 11000 Wolfe Road, Dept. 304, Cupertino CA 95014.

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Editorial

Another Wait for Users

The Bell Data Network (BDN), AT&T's answer to the public packet network, has been expected for some time. But now a document has surfaced giving details of the projected network offering as of November 1976 [CW, Sept. 5].

The BDN document is most interesting for what it does not say. The "Service Offering Statement" made no mention of an X.25 compatibility, although that may still be included when the network is announced.

The exact date BDN service will begin is believed to have been postponed several times within AT&T. Reportedly, the features of BDN will depend heavily on the findings of the Second Computer Inquiry.

The BDN document, using the most liberal interpretations of what constitutes communications processing, includes data entry, inquiry/response, remote job entry and message distribution. If AT&T can convince the Federal Communications Commission (FCC) these are functions associated with communications, then BDN will probably be announced shortly afterward.

But a definition of what constitutes communications processing is a key issue in the reopened Computer Inquiry. Vendors of DP services and suppliers of equipment are expected to protest the Bell concept, which would relegate DP functions and their associated software to the regulated domain of the telephone company.

A decision in the FCC inquiry could take some time. In the meantime, AT&T will be under pressure from other emerging packet networks to make a move toward BDN. Whether this will mean an initial limited version of the BDN service is known at this point only to the top brass at the phone company.

There are some industry experts who watched AT&T's Transaction Network Service (TNS) with great interest. These sources saw in TSN the first steps toward a public packet offering, even though TNS was aimed at a limited financial-type user.

The firm most directly affected by BDN would be Telenet Communications Corp., which depends on AT&T long-line facilities to provide its packet-type service.

Meanwhile, data communications users will have to wait until the regulatory roadblocks are debated and disposed of one by one. Whether BDN will be offered in the form outlined in the Bell document is open to question. AT&T may have to perform some significant fine tuning on the concept if the FCC proceedings are not favorable to its pleadings.

The issue of whether BDN will become a regulated phone company service strikes at the very heart of the computer/communications boundary dispute. There is little doubt that AT&T has the resources and ability to offer a BDN service. However, whether it will be allowed to do so is up to regulators and, perhaps after that, the courts.

Trying to define the limits between the nonregulated DP industry and the regulated communications industry is certainly an important issue. But customers who could use the BDN service to optimize their business telecommunications operations get little comfort from waiting for the regulatory machinery to grind slowly on to another "final" solution.

Data Past

Five Years Ago
Sept. 13, 1972

WHITE PLAINS, N.Y. — IBM raised the rates for systems engineering (SE) services, some field engineering (FE) services and the minimum monthly maintenance charges on selected pieces of equipment. A 5% to 10% price rise for SEs affected the greatest number of users, while the higher rises for FE services affected only customers with purchased machines.

— — —

SALT LAKE CITY, Utah — Univac introduced a programmable front-end processor that could support non-IBM terminals as well as replace IBM communications controllers. The 3760 communications controller, said to be plug-compatible with IBM 360/370 mainframes, marked Univac's initial offering of an IBM replacement.

Eight Years Ago
Sept. 17, 1969

LEONIA, N.J. — Compuscan, Inc. announced an optical character reader capable of learning new characters or entire alphabets online. The Model 370 was priced at $900,000.

— — —

CUPERTINO, Calif. — Information Storage Systems, Inc. introduced the ISS 714, a disk drive "fully compatible with IBM's 2314." The company claimed the 714 had an average access time of 32 msec compared with 60 msec for the 2314-A1 and 75 msec for the older 2314 system. Startup time of the ISS 714 was said to be one-third that of the 2314.

Letters to The Editor

Spectra Not IBM-Compatible

I was astounded by Jerry Nesmith's claim in the Aug. 29 issue ["Credit Should Go to RCA"] that in 1970 RCA had a CPU that would run IBM operating systems. The Spectra 70 had a different interrupt system, I/O architecture and storage protection system from the IBM 360, and the later 3, 4, 6 and 7 were just repackaged Spectra 70s.

If RCA ever had a compatible CPU, it was never part of the commercial product line.

Seymour J. Metz
Rockville, Md.

Iverson Inventor of APL

The Aug. 22 issue provided good coverage of the recent International Federation for Information Processing (Ifip) congress held in Toronto. I would, however, appreciate it if you would publish a correction to the report of the planning session of which I was chairman.

The article ["Inconsistent Data Seen Major Snag in Planning"] stated I was one of the inventors of APL. This is patently incorrect. APL had only one inventor, namely Kenneth Iverson.

Ian P. Sharp
President
I.P. Sharp Associates Ltd.
Toronto, Canada

He Couldn't Be More Wrong

After reading Joe Rigo's response to the Certificate in Data Processing (CDP) exam challenge issued by Ken Lord [CW, Aug. 29], I couldn't be happier that Rigo is not one of my employees. At his age, he should be striving to learn new concepts and methods instead of sitting back on his laurels and blaming his lack of knowledge on old age.

Without knowing anything about the exam's content, Rigo stated that tests like the CDP exam "are for kids just out of school." He couldn't have been more wrong.

The questions on the CDP exam should not be compared to "sixth grade lists of major exports of South American countries," any more than the questions of the bar exam should be compared to Dell Crossword puzzles. I suggest that Rigo learn what the test questions are like first-hand before he stereotypes the exam.

I cannot imagine anyone saying he knows just enough for today's job and will learn what is necessary for tomorrow's. Such people are more aptly called vegetables. They are not the type of people who have helped in the advancement of data processing. If it were up to people like Rigo, I'm sure most of us would still be wiring 407 boards.

Yes, poor Rigo is quite correct when he says he would flunk the exam. And that is one more indication of the exam's merit.

David T. Guidos
Torrance, Calif.

Three Cheers for Rigo

Hooray for Joe Rigo!

As a "computer professional" who started on the Univac I in 1957 and quit the Association for Computing Machinery in protest many years ago when a college degree was added as a requirement for new members, I'd like to play on Joe Rigo's team.

Ken Lord's letter was amusing and rated a chuckle. Joe Rigo's reply deserves a cheer.

William Kohlbrenner
Guilford, Conn.

(Other letters on Pages 32 and 33.)

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

A Case of 'Disconnect'

Reader Ponders Conflicting Life, Job Goals

By Jack Stone
Special to CW

Painter Hoffman's letter about DPers' relationships with their families [CW, Aug. 8] has had a profound effect on those with whom I've talked. But, no one has expressed his feelings so sensitively as the writer of the following letter:

Dear Jack:

Painter Hoffman's letter brought tears to my eyes. Having just lost, through divorce, a wife and family of 20 years, I think I'm qualified to comment on the DPer's side of the disconnect.

I'll grant Painter's conclusion that those of my ilk tend to think remotely and to subject feeling to insatiable scrutiny. I'll even grant her frustration when her spouse ran out of gas on Christmas night. Just now, Jack, am I forcing myself to again observe the sunrise over the pastel houses, the color of flowers strewn along the winding path and the sounds of birds and insects carried on the breezes.

But most importantly, after 20 years of marriage, during 15 of which I have been involved in this industry, I'm finally beginning to again see people for what they are, get to really know them, and, in the process, get to like myself again. After two decades of marriage and a decade and a half in DP, I've finally asked myself, "Is that all there is?"

In so doing, logical thinker that I am, I have to ask how it happened. What turned a youth so full of promise into a person whose very ideas are subject to open attack? True, many can be blamed, but I do not overlook myself for that blame, for where I should have been strong, I conceded, and where I should have been gentle, the strength — too much of it — came out.

Like many a young American male, I was programmed for "success" by my parents who had not achieved a degree of success that satisfied them. It was important, as far back as I can remember, to become educated, to have a nice house, to be a family man and — and I can still hear my mother's words — to "make something" of myself. In retrospect, there have been times I sincerely wished to have followed my initial impulses to drive a truck.

But the programming was absolute, and one so programmed is attuned to grab each opportunity and to exploit it to the fullest. Such was the case with me. My chance to get into DP came along in a flash, and I took it, totally — I cannot now say blissfully — unaware that for the next nearly two decades someone would be constantly waiting to extract the pound of flesh.

True, I was interested. True, there was magic in knowing it was my program which made the lights blink and the tapes turn. What started as an opportunity became a fascination, an all-consuming passion to conquer this intellectual Mount Everest. On the other side of this seemingly insurmountable cliff stood the promise of Shangri-la.

The Human Connection

Little did I realize that my intellectual efforts were merely the satisfaction of the needs of others to exploit my potential to move that 16 tons of coal every day. Conquest of each successive peak was followed by reward, a reward which carefully and neatly disguised that I was selling my soul, byte by byte, to the company store. And for each conquest I made, there were two more waiting to be tackled. And always there was somebody more concerned with how you climbed the mountain, rather than the fact that you did it at all.

As the rewards and "success" came, the box systematically closed in, forming a harsh trap from which there was no escape. On the one hand there were the needs for shelter and support of a growing family, which, when coupled with an ever-increasing set of economic demands, never quite permitted one to get solidly established or to get ahead.

On the other hand, there were the constant granting and withholding of reward, privilege, opportunity and exploration afforded by employment. But they could never be separate. Without the latter, the former was not possible by itself, and it was certain that the demands of the former would increase, not decrease. What was one to do?

Well, what I did was to become mobile, first in terms of employment, as only change in employment could satisfy the rate of growth required to satisfy the economic needs. All the traditional values of stability, loyalty and adequate compensation for earnest endeavor could simply not be satiated by remaining in one place. On the one hand, it had to come faster than it was coming, while on the other, I found one artificial roadblock after another be it a degree, mode of dress or whatever. Granted, some I created for myself. My only regret is that I didn't retreat when I began to recognize it. Again, however, I could not, for I had been programmed for responsibility.

My ex-wife, though not expressing it in a manner that was clear to me, recognized it in 1968 when she said it was here where the roots would

(Continued on Page 24)

A Workable Approach

Don't Risk Getting Sacked for Being Ethical

The Taylor Report
By Alan Taylor CDP

If an employer asks his computer people to do something illegal and they refuse, they should not be fired. Nor should they be fired if they refuse to do something that falls in the gray area between right and wrong or if they refuse to do something the employer said he would not ask them to do when he hired them.

But exactly how can a DPer be sure he won't be sacked if he refuses? That's the problem that has sunk so many DP codes of ethics — and it's the key to DP responsibility.

But there are other items to be considered before a system of DP responsibility can be set up. The first is the recognition by employers and employees alike that there are dangers in DP and that they are dynamic.

Some old dangers will dissolve as we adopt new methods or as it becomes economical to test for gray areas. Other dangers will be born, or identified from time to time, and sometimes end up in legislation.

More often, however, they will be restricted to specific professional and industry codes and methods of handling DP. And a responsible DP system has to recognize both that such dangers may exist without having been pinpointed as illegal and that responsible DP should face up to this as well as illegal DP activity.

Future Scenario

The way this approach might work could be as follows: A programmer goes into a job interview, and everything is OK. When the final details are worked out, he is told to go over to Personnel to arrange for his physical and get his "DP Policy Statement."

The personnel officer gives him a form (see box) rather like one of those "disclosure" statements about interest of loans or deliberate overbooking on airlines that have become so popular of late.

The prospective employee is asked to sign the policy statement after reading it, and it becomes as much a part of his agreement with the firm as anything else. It gives both him and the firm restricted rights to have DP checked for dangers and to have the work performed without ethical worries.

If he later runs into problems, this policy statement spells out what his procedure is, how much — if at all — he can complain and safeguards his job. Yet it permits ethical issues to be raised.

Of course, there are some visible effects that would go down to the computer room and the programmer's desk. Whatever the company policy is, the DP designer will have to review the design to check that it conforms with the policy and to include in the documentation details of how such a check was done so the people who later run the system can tell whether a situation really was checked out or simply overlooked. And management instructions regarding the conditions in which some gray area parts can be run will also have to be part of the design documentation.

Similarly, the operational area will have to know where these

(Continued on Page 24)

Attatulish, Inc. DP Policy

The Attatulish DP policy represents the corporation's understanding that the use of computers sometimes has unwelcome side effects and recognizes the corporation's intention to minimize or eliminate those side effects whenever found.

It has therefore adopted the provisions of the [insert name of trade association] guidelines, a copy of which is attached, and expects all of its employees to be guided by them whenever any question of computer operations is raised or when any invasion of privacy by computer is suspected.

In addition, your participation is invited at the annual seminar on computer responsibility in Attatulish held in January.

Issues not otherwise resolved quickly that could involve any unprofessional use of computers should be brought to the attention of the director of [insert appropriate title] at any time.

This policy statement, incorporated as part of an employment contract, could go far in establishing a workable and effective set of professional ethics.

Reader Bemoans Family, Work Conflicts

(Continued from Page 23)

be put down and they wouldn't budge. But that didn't stop me. The pressures were still the same. If you had a project, you had employment. If you didn't, that was it. And all the time there were increasing needs to be met. It wasn't the frills which were required — it was the necessities.

Then, there came a point where it became perfectly obvious that no employment in and of itself would ever provide them. In the need to do even more, I went into business for myself. Yes, I dressed it all up in "objectives," ambition, self-reliance and independence. But the simple truth was that I was caught in a vice from which there was no escape — at least no honorable escape.

My creativity was thwarted and the pressures allowed no time to relax. The only difference was that the hills I now climbed were hills of my own making and the coal I moved was in reality my own coal, except that it was continually being consumed faster than I could mine it. The demands of working for oneself now intensified the work and travel schedule and the home situation worsened — to the point that we all began to ask, "Is that all there is?"

Creativity has a way of getting out. Thwarted creativity has a way of coming out in a very negative manner. That happened to me.

And now the bubble has burst, and I'm left — alone — to pick up the pieces and to try to put them back together again in some semblance of reason. I'm deprogramming myself now, but the burden of knowing that it wasn't in time to be of benefit to my wife and kids is heavy indeed, as they must now make the same mistakes I did. The pressure is still there, but it is more remote, and my sense of responsibility demands that for the rest of their young lives I must continue this way, if only to ensure their survival until they can find a way to stand on their own feet and make their own mistakes.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

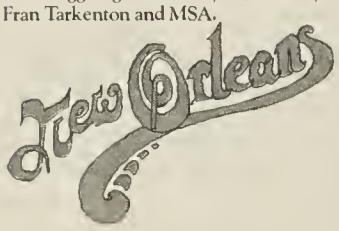
By that time, my service to this industry will itself have reached two decades, and at that age I'll be just another throwaway to an industry which has concentrated on youth, and I'll emerge a person much worse for the experience. But hopefully, I will emerge a person. I haven't been a person for a very long time.

Jack, if you decide to use this letter or any part of it, I urge you to implore your readers to let their spouses read it with but a simple plea: Stop! There has to be more than this. Find a way, within or without this industry, to prop open the trap before it springs shut, for if you ever do escape, you do so at your own peril. It would be far better to ensure that you never even get into the trap.

Win

Fran Tarkenton's Super Bowl Tickets

Enter MSA's "Super Pool" and win a free trip to the Super Bowl. Free airline fare, free accommodations at one of New Orleans' luxurious hotels, and free tickets to the biggest game of the year, courtesy of Fran Tarkenton and MSA.



All you do is peer into the future and pick the winning team of each upcoming NFL Monday Nite Football game (plus one extra game to make things even), plus a tie breaker for the season. All are ABC televised games.

Circle the winners, do not pick ties, clip the entry blank and send to MSA Super Pool, 3445 Peachtree Rd., N.E., Atlanta, Georgia 30326.

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August 10, 1977

John P. Imlay, Jr.
President
Management Science America, Inc.
3445 Peachtree Road, N.E.
Atlanta, Georgia 30326

Dear John:

I'm going to send you eight tickets to this year's Super Bowl. Each NFL player gets an allotment and I thought you might put them to good use.

As you know, I really enjoy my association with MSA during the off-season. You've put together a great team and it's a pleasure working with them.

When you're Number One in anything, you can't let up a minute. And it's pretty obvious that MSA is the leader in the financial software industry. So your customers get the best of everything.

Hope you enjoy the tickets!

Sincerely,

Fran

Fran Tarkenton

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Oct. 3	Oakland	at Kansas City
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Oct. 17	Cincinnati	at Pittsburgh
Oct. 24	Minnesota	at Los Angeles
Oct. 31	N.Y. Giants	at St. Louis
Nov. 7	Washington	at Baltimore
Nov. 14	St. Louis	at Dallas
Nov. 21	Green Bay	at Washington
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Dec. 12	Dallas	at San Francisco
Dec. 17	Minnesota	at Detroit

Tie Breaker:

The team scoring the most points in any one of these games will be _____ (Team).

The game in which the most points will be scored will be _____ (Date of Game).

The number of points scored will be _____ (Number).

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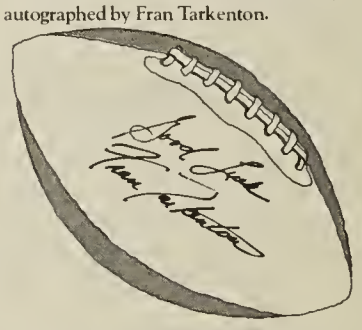
There will be one winner of a Super Bowl Trip for four, two winners of a trip for two, and twenty third place winners who will each receive a leather exhibition football, autographed by Fran Tarkenton.



Entries must be postmarked no later than Sept. 30. Facsimiles of the entry blank are acceptable, however, only one entry per person. An independent judging firm will announce the winners in late December.

So get busy, sports fans. Make your selections and send them in. Someone will win these glorious, fun-filled Super Bowl trips to New Orleans next January, and it could be you!

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Policy Allows Ethical DPers

(Continued from Page 23)

items are and understand them as well as it understands the other operating instructions. But, by and large, the impact on the installation will be minimal. It will just tell where the DPers stand with the employer, and prevent them from getting sacked on the one hand and keep the computers from being used unethically.

Only one last question remains — and that is as to why DPers really need ethics. The answer seems to lie in the siamese twin relationship between the system and programming areas, which decide everything and do nothing; and the operators, who do everything and decide nothing.

Neither group really wants to be involved in something unethical, but until the two sides are put together after the decisions are made, the problem can be easily overlooked.

Only by having some procedure such as outlined here can everyone involved in computers know they can be ethical without risking being sacked.

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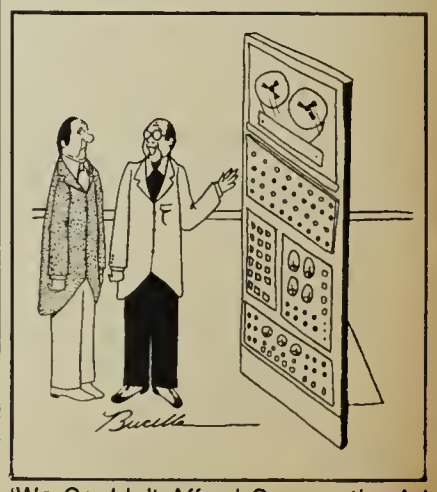

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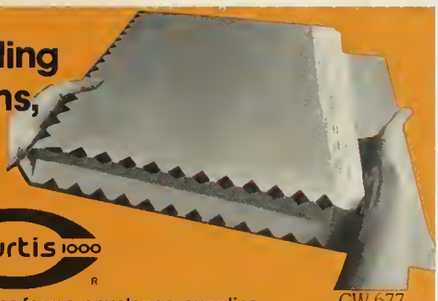

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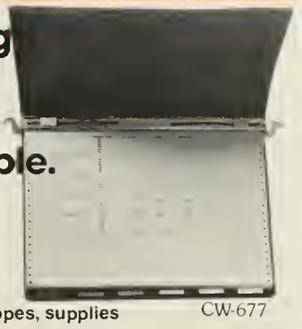

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'Ultimate' Method an Illusion

Users Facing Better Structured Designs

By Kenneth T. Orr
Special to CW

In his recent article [CW, June 6], Gopal Kapur certainly hit upon a significant topic — the confusion over structured technology. I find many people share Kapur's confusion. Since it first became a buzzword a few years ago, the use of the word "structured" in conjunction with programming has taken on a variety of meanings, many of them quite different from one context to another.

A few years ago, there was a basic agreement about what structured programming was. It meant, more or less: "GOTO"-less programming, hierarchical design and top-down development.

Indeed, there was a great deal of agreement and very little practical experience. At that time, very few people had used any or all of these tools to design reasonably sized programs — much less to design systems.

In the last four or five years, we have learned nearly as much about systematic systems development as we have in the last 10 or 12. Surprisingly, from the tone of Kapur's article, you might infer there is not much of substance behind all this literature.

But this is not the case. Indeed, the very fact that there is so much being written today about structured programming and structured systems design indicates something very important is going on.

While I think Kapur's conference is probably a good idea, I seriously doubt that such a conference is likely to produce the agreement on the subject he would like to see. Indeed, I have participated in a number of such meetings, including a Guide meeting in Chicago in November 1976 and a structured systems conference in Paris recently. And in all of the various structured conferences I have attended, I find participants who are enthusiastic about the effects of structuring on systems and programming, while at the same time having their own ideas as to the exact meaning of "structuring."

No, Kapur is apt to continue to feel frustrated. Indeed, since he teaches structured programming, he has his work cut out just keeping up with structured programming technology, not to mention keeping up with structured systems design and structured data base design.

I noticed that Kapur didn't mention Jackson, Yourdon, SADT, or Langston-Kitch structured methodologies. That just shows you how quickly things develop in a new area.

Mixed Group Best

From experience, I would suggest that the best way to learn about structured technology is not by gathering a group of skeptical managers together to discuss whether structured programming is what they are already doing. In most cases, we have found it is far more productive to get together a mixed group of people that includes people who have been using the technology for a copule of years, along with some others who are interested in finding out what is currently going on.

My firm has hosted two users' conferences on structured systems design in the last two years, and I feel the experiences discussed at those conferences would convince even the most skeptical manager.

The structure experience is now worldwide. I recently visited an organization near Paris (Societe Placoplatre) which has been involved in structured programming with Warnier and his group since 1969 and is now into structured data base and structured systems operations as well.

It is my guess that, unfortunately for Kapur, there will be more — rather than fewer — structured methods coming out in the next few years. My guess is that it will only be after some extensive shakedown period that these methods will begin to converge into a common technology.

Reader Commentary

But waiting for the ultimate is folly — it simply won't happen. In fact, organizations that choose any of the structured methods are apt to be better off than they are right now, simply because of the advantages resulting from the discipline required to structure a system. And those who move directly into applying structuring at the systems level will be in an increasingly good position.

In the last few years, we have seen a number of different camps emerge, all flying the "structured" flag. As a result, many managers

(Continued on Page 30)

Removing the rose-colored glasses.

A realistic look at *Data Base Management Systems* in the October 31st *Computerworld*.

In the ten years since Data Base Management Systems were introduced they've grown to a multimillion dollar subindustry in their own right. As late as 1973, less than 1,000 DBMS were installed; but International Data Corp. estimates that over 5,000 are in use today, and this number will increase to 8,200 in the next two years. This phenomenal growth has been fueled by the hoped-for benefits of DBMS, which include increased programmer efficiency, the elimination of redundant information in the data file, and greater ease in coping with system upgrades and reprogramming.

But a data base management system should be evaluated carefully before you commit to purchase. They have developed such a reputation as problem solvers that people tend to expect more from them than they can achieve, while overlooking or minimizing the effort required.

We'll have several experts on hand to help you arrive at a realistic understanding of DBMS in our October 31st special report edited by Don Leavitt. Here is a sampling of the kinds of articles you'll see:

- Combatting the "Holy Grail" syndrome — Being realistic about the benefits that are possible in relation to the effort required; how to assess whether DBMS will enable you to reach your goals.
- How well are installed systems living up to expectations? A review of typical problems that need to be overcome.
- The role of the Data Base Administrator in DBMS — including considerations like the physical arrangement of the data base.
- How dictionary packages, report writers, etc. interface with DBMS software.
- A review of selection criteria and the implementation process.
- How DBMS ties in with distributed data processing — matching intelligent front ends with intelligent back ends, for example.

As this short preview shows, our special report on Data Base Management Systems in the October 31st issue will interest people who are considering DBMS, as well as people who already have one installed. And if you market Data Base Management software, remember that your ad will reach more of your primary audience here. Ad closing date is October 14. Your *Computerworld* salesman has all the details. Or call Terry Williams at (617) 965-5800 to reserve space for your ad.

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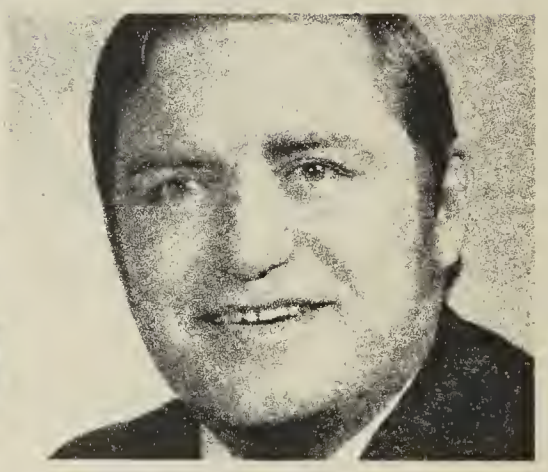

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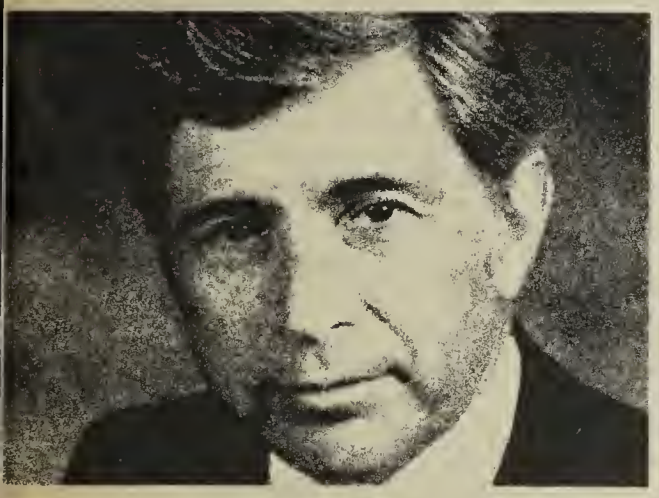

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THE SEARCH IS ON

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'Software,' 'Program' Not the Same

'Program Writing' Fits Copyright Class Only

By Martin A. Goetz
Special to CW

A feel compelled to respond to the July 11 editorial about the National Commission on New Technological Uses of Copyrighted Works (Contu) and John Hersey's dissenting opinion.

As a long-time advocate of "software protection," I believe that some of the existing controversy is a result of the imprecise use of the terms "software" and "programs." While those terms have often been used synonymously, I do not think they are interchangeable. A program can be in hardware (hard-wired) or in firmware (read-only or programmable read-only memory) and may not be at all soft.

Applied Data Research, Inc. (ADR), like IBM and many other companies, develops program products and has used the copyright system to protect its program "writings" for more than 10 years. The Copyright Office has been registering programs since the early 1960s.

Interestingly enough, Contu was not originally established to determine if programs were copyrightable, but to determine the status of conventional works of authorship when these writings are created, stored and processed by a computer. Contu's Oct. 8, 1976 preliminary report states on page 14:

"One of the first significant questions facing the commission was whether the protection, possibly through copyright of proprietary rights in computer software, should be within the scope of its mandate."

I learned earlier this year that Contu was leaning toward recommending the copyrighting of programs — not because copyrighting is the most reasonable, logical protection method, but because it was preferred over patenting.

I have been quite concerned with Contu's reasoning because the copyrighting of programs does not conflict with the "patentability of software" and therefore should not be a subject of contention.

ADR has spoken before the commission and is actively following the Contu hearings via the published transcripts. We support the commission's majority report and do not agree with John Hersey that a new registration system is desirable because the existing copyright laws are applicable and adequate.

We do urge the DP community to note Hersey's description of a program, which really hits the nail on the head when considering the "software patentability" question. He says that programs, when executed by a computer, are a mechanical (or electronic) device.

ADR has argued that point for many years. The patentability question focuses on whether programs, when put in a computer, are devices and part of a machine.

In fact, in the previous Supreme Court reviews regarding software patentability, the central question was: "Is a machine process that is patentable if implemented in hardware (a circuit) equally patentable if implemented in software (a program)?"

I believe this question will again be the issue before the Supreme Court. The patentability of the "machine process implemented in software" is open to widely differing opinions and John Hersey's viewpoint may help influence the Supreme Court to rule that software can contain patentable subject matter and is part of a machine. But, in my opinion, a "program writing" is clearly only copyrightable.

Goetz, senior vice-president of Applied Data Research, Inc. in Princeton, N.J., is chairman of the Association of Data Processing Service Organizations' Software Protection Committee.

Reader Commentary

Structured Design Better

(Continued from Page 27)

see structured anything as just another set of programming tricks. A small number, though, have seen "structuring" for what it is — a technological revolution. These have been the people who have taken over the structured theory and have made it work on real problems.

Constantine, Myers and Yourdon have done an excellent job of studying and documenting the characteristics of good and bad programs. But it is even more important to be able to have a methodology that tells you how to develop a good program from the outset so that you know it is correct when you are done.

That is what the Warnier, Jackson and Langston-Kitch approaches do. Jackson's methodology does it fairly well at the program level, and the Warnier and Langston-Kitch approaches do it at all levels: systems analysis, systems design, data base design and program design.

Software's Turn

For two or three decades now, the hardware folks have been learning to deal with management in the midst of constant technological change. Changes in software have been somewhat less dramatic, but also less productive. Now that breakthroughs have been made in the logical design of programs, data bases and systems, software management is going to be dealing with the same management problems the hardware management people have had to face on an ongoing basis.

The systems we build in five or 10 years will bear little relationship in terms of accuracy, cost, time or reliability to the ones we are building today. We are already well into our third generation of structured systems tools and techniques, and the effects are beginning to snowball.

The principal problem for today's data processing management is not just one of catching up, but one of planning to keep up as we learn more and more about doing things more productively. What was being taught in 1972 as the state-of-the-art is already out of date.

We must be prepared to deal with the future, not the past.

Kenneth T. Orr is vice-president, Advanced Systems at Langston, Kitch & Associates, Inc. in Topeka, Kan.

Are Promising Programmers Slipping By?

By Jack M. Wolfe
Special to CW

In their selection procedures for programmers or programming trainees, some personnel directors administer a programming aptitude test that is, in effect, a speed test. Such a test is likely to be biased in favor of the college graduate, who is generally test-wise; he knows how to take a multiple-choice type of test that usually cannot be completed within the time limit allowed.

A company using such a test in the selection screening is likely to lose the careful, deliberate worker who rereads specifications for precision of interpretation and desk-checks carefully for accuracy in execution. Such a worker will seldom complete a test in which speed is a significant factor.

But such a worker may possess just the right attributes and good work habits for successful work in programming. Such a worker, moreover, will prove to be the one who is actually faster on the job because he will have less debugging and testing to do in bringing his jobs to successful completion.

A study of the relation between speed and score was made using the "Aptitude Assessment Battery: Programming," a test I developed which is generous in its allowance of time. Although the average time required for the completion of the test is about three hours, the time limit has been set at five and a half hours, which has been found to accommodate 99% of the persons who have taken the test.

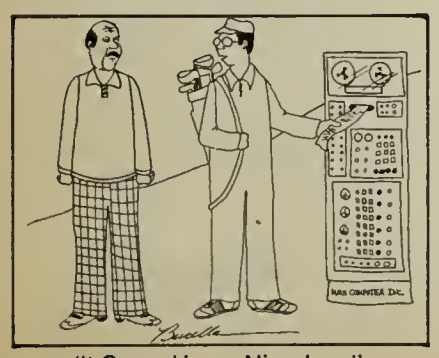
The test itself has been validated for on-the-job performance in programming by an agency of the U.S. government.

In a study of the results of more than 700 programmers and programming trainees with regard to speed and score, the group tested was distributed as follows:

	Slower 50%	Faster 50%
Higher scoring 50%	22%	28%
Lower scoring 50%	28%	22%

Thus the relationship between speed and aptitude for work in programming, as measured by this test, is not a very strong one. The coefficient of correlation represented by this table is only .12, which shows a positive correlation but not a strong one.

The speed factor in a screening test will cause the rejection of many capable persons. Consequently, a company will be meeting its needs for programming personnel by employing some persons who earned their higher scores by working with greater speed, rather than with greater precision.



'It Says: Use a Nine Iron!'

Even when the group studied was the superior group consisting of the highest scoring 25% of the programmers and trainees tested, the wide dispersion in speed was again observed:

Fastest 25%	34% of Superior Group
Next 25%	25% of Superior Group
Next 25%	20% of Superior Group
Slowest 25%	21% of Superior Group

Thus a substantial portion of this superior group, about 40%, would very likely have been eliminated from further consideration if the personnel department used a screening test in which speed was an essential factor.

Reader Commentary

A personnel director may feel satisfied that his use of such a test is appropriate because the screening test scores have been found to correlate satisfactorily with the grades assigned by the company's instructors in its training classes. But grades in training classes do not constitute the proper criterion for validating a screening test. Tests in training classes are also strictly limited in time.

It is sometimes claimed that the problems on a screening test are arranged in ascending order of difficulty and that the persons who did not finish the test would very likely have been unable to do the remaining problems even if they had more time. This claim is obviously untrue for the slow worker who did well on the problems that he did reach on the test.

And every researcher in testing is surely aware that there are numerous occurrences where a person makes errors on "easier" problems and then correctly completes other problems that are rated as more difficult.

As a practical matter, however, it is essential that some time limit be established in aptitude testing. Otherwise there will be some applicants who will just sit all day and go over their work virtually endlessly.

In establishing a time limit on its screening test it would be reasonable for a company to set such a limit at the point that will enable 90% of its applicants to complete the test. The test scores can then be used to rank the applicants, rather than for the assignment of percentile ratings as established in the table of norms issued by the publisher of the test.

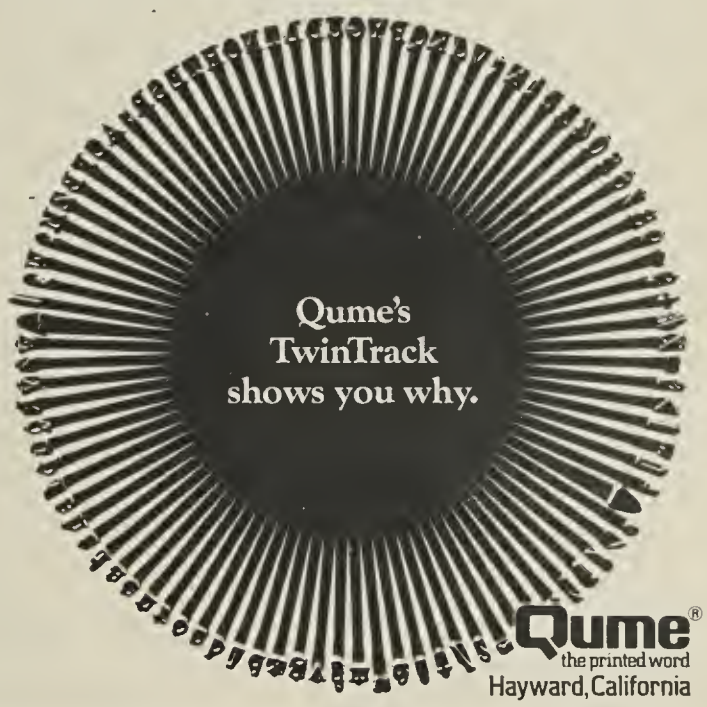
Even the presentation of the work in training classes adheres to a rather well filled course outline. Thus the training class ratings favor the faster workers and are likely to underestimate the more capable but slower workers.

In on-the-job programming, a person works at what is basically his normal pace. In his actual work in programming, his seeming slowness because of his careful desk-checking of his work as he goes along will pay off in effectively making him a fast programmer in bringing his jobs to a successful conclusion.

But such superiority is not as likely to show up in his training class as his subsequent work on the job in programming.

A company can ill afford to let highly capable talent slip through its fingers unrecognized. Nor is it fair to the applicant who may thereby be discouraged from applying to any other company and may remain at an occupational level lower than that for which he actually posses potential.

Wolfe, o member of the board of directors of the Associotion for Computing Mochinery's Special Interest Group on Computer Personnel Reseorch, is president of Progromming Speciolists, Inc. in Brooklyn, N.Y.



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If you're having trouble communicating with your computer or computer terminal representative, call or write Trendata for a rendezvous.

Letters to the Editor

DP Business Should Have Professional Standards

Dear Joe Rigo,

I found your comments very interesting [CW, Aug. 29]. I, like yourself, am growing old. Although not 44 yet, I have been in DP now for 12 years. I started out on tab equipment and watched it grow, and I agree with your idea of nothing replaces experience. I have yet to see a person come directly out of school and sit down and write an efficient and dependable set of code.

In my years of working with DP and in business I have repeatedly noticed several discrepancies. I have seen people who are the opposite of Carmine Vona — people who, because of their bad DP habits, have virtually destroyed companies. These companies and the people who run them do need protection from the pseudo-data-processors.

This, in my estimation, is what the Certificate in Data Processing (CDP) is all about. It isn't for our generation; but we, with our varied experience, can and must make it work for succeeding generations. At the present, we are like the accountants were before CPAs. No ethical control. No social responsibility. No commitment. We cannot tell whether a beginning programmer or computer operator will be able to do the job.

Now don't get me wrong. I'm not saying the CDP and the Certificate in Computer Programming (CCP) will resolve everyone's problems. As always, we will have bad computer operators and accounting clerks; bad programmers and bookkeepers; bad systems analysts and comptrollers/CPAs. But we will have a set of standards, and non-DP people will have someone to turn to. If we then do not police our own, we will have socialized data processing. Not a threat, but a possibility.

So, Joe, you and I can either get our CDPs or we can continue much as we do today. It really doesn't matter to us. But, I also agree with Gary Casper; we need to professionalize our business, before someone does it for us, for the public good.

Walter A. Blankinship Sr.
San Antonio, Texas

Certificates Not Useless

The Reader Commentary section of the Aug. 29 issue was very interesting reading. Joe Rigo reminds us of the fact that the Certicate in Data Processing and/or the Certificate in Computer Programming (CCP) do not necessarily qualify a person as a computer professional. I agree!

However, Rigo failed to mention that professional people like Carmine Vona are not the average, run-of-the-mill data processors. The qualifications of any good systems analyst should, by definition, make everyone around him look good. While technical expertise is very necessary in implementation of computer systems, it is not, in my opinion, the critical factor that divides the average analyst from the outstanding person.

A good analyst is dedicated, realistic, well organized, highly motivated, accepts constructive criticism and insists upon user participation and management review and support. The good analyst sees the computer as another tool made available by company management for the solution of the problem.

Too many systems people see the computer as the end rather than as a means to the end. Very often, sophisticated computer systems are designed to satisfy the ego of the systems person instead of providing the user with meaningful information that is cost-effective and useful.

The good analyst believes training is an essential part of system implementation. He is not afraid of developing the capabilities of other team members assigned to the project.

The good analyst utilizes proven project management techniques to ensure projects are implemented on time and within budget.

Unfortunately, for every successful systems analyst I have seen, I can point to dozens of unsuccessful, unqualified people who have blazed their way up the ladder of success at the expense of their fellow workers.

Obviously, the CDP and CCP, like the formal BA, BS, MBA, etc. do not by themselves replace the invaluable experience gained through years of active participation in the "school of hard knocks." The use of CDP after your name should be as important to the DP professional as the MD is to the doctor.

Perhaps the CDP is not as important today as many people would like it to be. However, to take the attitude that the CDP, the CCP and a code of ethics are useless ensures that our profession will continue to be cluttered with unqualified egotists ready to force their sophisticated garbage on an unsuspecting user community.

While Prof. Casper's comments obviously cannot be taken as gospel for the DP community in general, they can be applied to evaluating a significant percentage of its members.

Perhaps the problem can be eliminated. However, without the involvement and leadership of the qualified professional, this is an impossible task.

Richard M. Dawson
Oberlin, Ohio

This is an ad for Xerox computers.
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If you don't have a Xerox computer now, look into one. System architecture is remarkably advanced and in such tune with the software that users claim the computers deliver up to 95 percent of capacity. Unheard-of efficiency.

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Compact main memory, high speed printers, communication processors, solid state RAD's, array processors, and on and on.

Most have powerful performance, reliability, and cost advantages over the Xerox units they replace. More important, they're available.

Recently, we announced a new mass store facility that brings "Winchester" disk drive technology to Xerox users – something previously available only to IBM users.

Telefile has even taken over complete system maintenance at some sites. Our service network now stretches to over 20 cities and it's growing monthly.

And now to give Xerox users room to grow, Telefile is embarking on the development of *two new microprogrammed Sigma mainframes* for introduction in 1978. One will run four times faster than Xerox' biggest machine, yet cost only about half as much.

That's computer enhancement. To Xerox users it means a way to take their computer investment and superior software into the 1980's in style.

Univac users, you're next.

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Enhancing computers is our business.

Letters to the Editor

More Than Certification

Many articles have been printed by *Computerworld* and others on the subjects of licensing and certification. The article by Jim Brown in the Aug. 1 issue informatively and nonemotionally addressed the question of whether the Certificate in Computer Programming (CCP) will repace the Certificate in Data Processing (CDP).

Several points that are really tangent to the main argument are regularly raised by opponents of licensing.

First, if, as Brown stated, "The ICCP [Institute for Certification of Computer Professionals] said that '. . . at the present time there are no generally accepted definitions of job functions . . . or agreement upon knowledge and skills to practice in these jobs . . . ,' " then how is it possible for certification to provide a uniform measure of knowledge and performance potential?

It would seem that some definition has to exist if it can be tested. Therefore, some definition exists which can be licensed.

Second, much uproar continues to obscure the reason for licensing DP professionals. The uproar belongs, and rightly so, to those individuals who do not wish to practice public DP.

Doctors, lawyers and accountants who do not practice their professions on patients or clients are free to apply their skills and knowledge as they wish without licensing or certification. The same should apply to data processors. Only those individuals should be licensed who desire to offer their services to the public on a professional-client basis.

Certification can be of significant value in a licensing program. Licensing, however, can go further: to define job functions; to establish knowledge and skills required to practice; to provide for continuing education in order to assure high quality of service; and to enforce, not merely promulgate, standards of conduct and performance.

Self-assessment and peer group evaluation can be imortant. To those of us who worked for our certificates, it was important.

I believe certification and licensing cannot be mutually exlusive. The two programs should serve those who desire to be served. For those individuals who choose neither certification nor licensing, I wish you success.

Thomas C. Alewine
Columbia, S.C.

Need Clearer Explanation

Jim Brown's article puts some of the previous articles on certification into realistic perspective [CW, Aug. 1]. However, it raises an important point that I feel needs clarification.

Brown stated that "certification encourages continuing education." Could he or the Institute for Certification of Computer Professionals (ICCP) explain this? I think that having attained a Certificate in Computer Programming or Certificate in Data Processing an individual would tend not to continue his professional education.

My wife is a registered nurse and a condition of her license renewal is 30 hours of continuing education every two years. Is the ICCP talking about certification or licensing?

If they are involved with certification, not licensing, could someone explain the relationship, or requirement, between their program and continuing education?

James R. Shannahan
Santa Clara, Calif.

Architecture, Not Machines

In regard to the story "PDP-11 Leading Choice for Military Standard" [CW, Aug. 8], I would like to make two corrections. First, the figure given as $3 million a year for Department of Defense software expenditures should be $3 billion.

Second, the article makes reference to "the [Digital Equipment Corp.] machines," which may give the wrong impression about the Military Computer Family project. The proposed standardization would be on the PDP-11 architecture, not DEC machines.

If implemented, this standard would enable the services to procure militarized hardware from several suppliers, all building to the government-specified architecture (i.e., instruction set), while utilizing their own hardware technology. In effect, the government would obtain a license from DEC to utilize the PDP-11 architecture, and would be free to pass on that license to potential suppliers, solely for the purpose of building militarized (not commercial) hardware.

Lt. Col. Alan B. Salisbury
National Defense Univeristy
Washington, D.C.

Tip for Saving Energy

The examples of saving energy in the June 23 issue of CW require expansion and reverse logic ["CPU Heat Harnessed; Utility Saves Face" and "IBM Plans Buildings That Conserve Energy"].

We can conserve as much energy in summer as we are now planning to save in winter by designing CPUs, other office machines, home appliances, etc., with a hood and blower if they don't already have a blower as refrigerators do.

John W. Ecklin
Alexandria, Va.

This is an ad for Univac computers.

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It's an unsolicited testimonial from Telefile Computer Products. And we've taken space again for two reasons:

First, for sheer number crunching and handling of large data bases, Univac computers are in a class by themselves (how else could they thrive under a quarter century of IBM competition?).

Secondly, there are hundreds of *older* Univac installations that could benefit significantly from Telefile's computer enhancement capabilities.

Key to Univac's success has been its evolutionary approach to systems design. The new 1100 Series machines are direct descendants of the Univac 1108, first installed in 1964 and still running strong.

But as 1108's and other models have grown older, remarkable evolutionary advancements in memory, peripheral and mass storage facilities have grown up around them. One way users could upgrade was to change out the mainframe into a gleaming new model. Univac makes it easy by keeping the software compatible.

Think of Telefile as being *counter-evolutionary.* We reverse the tides of time by applying new memory and accessory design to computers hobbled by the past.

Take our new fully compatible add-on memory for Univac computers. By taking advantage of latest technology, it runs faster, takes up less floor space, and runs on only one-third the power of the Univac memory it replaces. No software changes are required. And costs *are cut about 70 percent.*

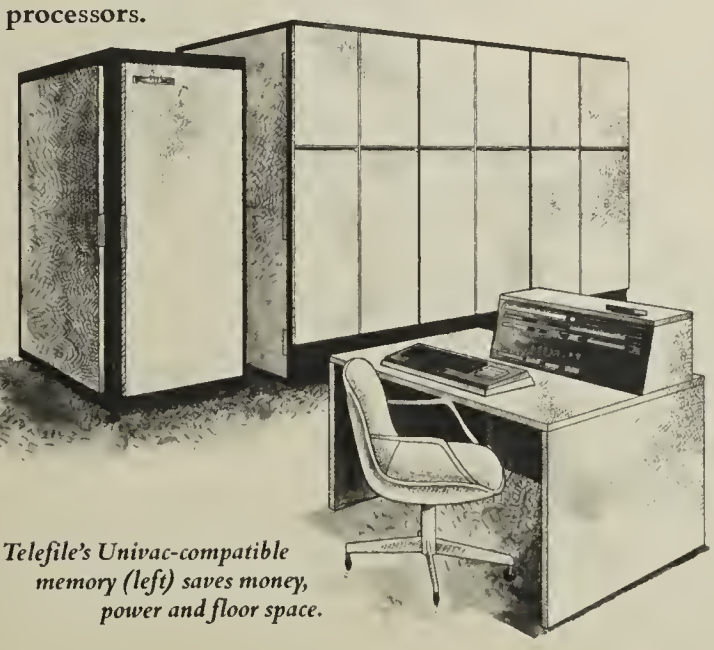
We currently offer unitized memory for 1110, 1100/40 and 1106 processors; and multi-modular memory for Univac 494, 1106, 1108, and 1110 processors.

Both memory types are currently up and running on Univac computers. On one, overall system throughput has been boosted by a remarkable *30* percent!

But this is just the start. Coming down the line are a solid state drum replacement and disk systems that leapfrog 3330 technology. Not to mention some other exciting developments we'd rather not mention right now.

We don't expect Univac to run an ad for Telefile, but someday the users might.

Write: Telefile Computer Products, Inc., 17131 Daimler St., Irvine, CA 92714. Phone: (714) 557-6660.



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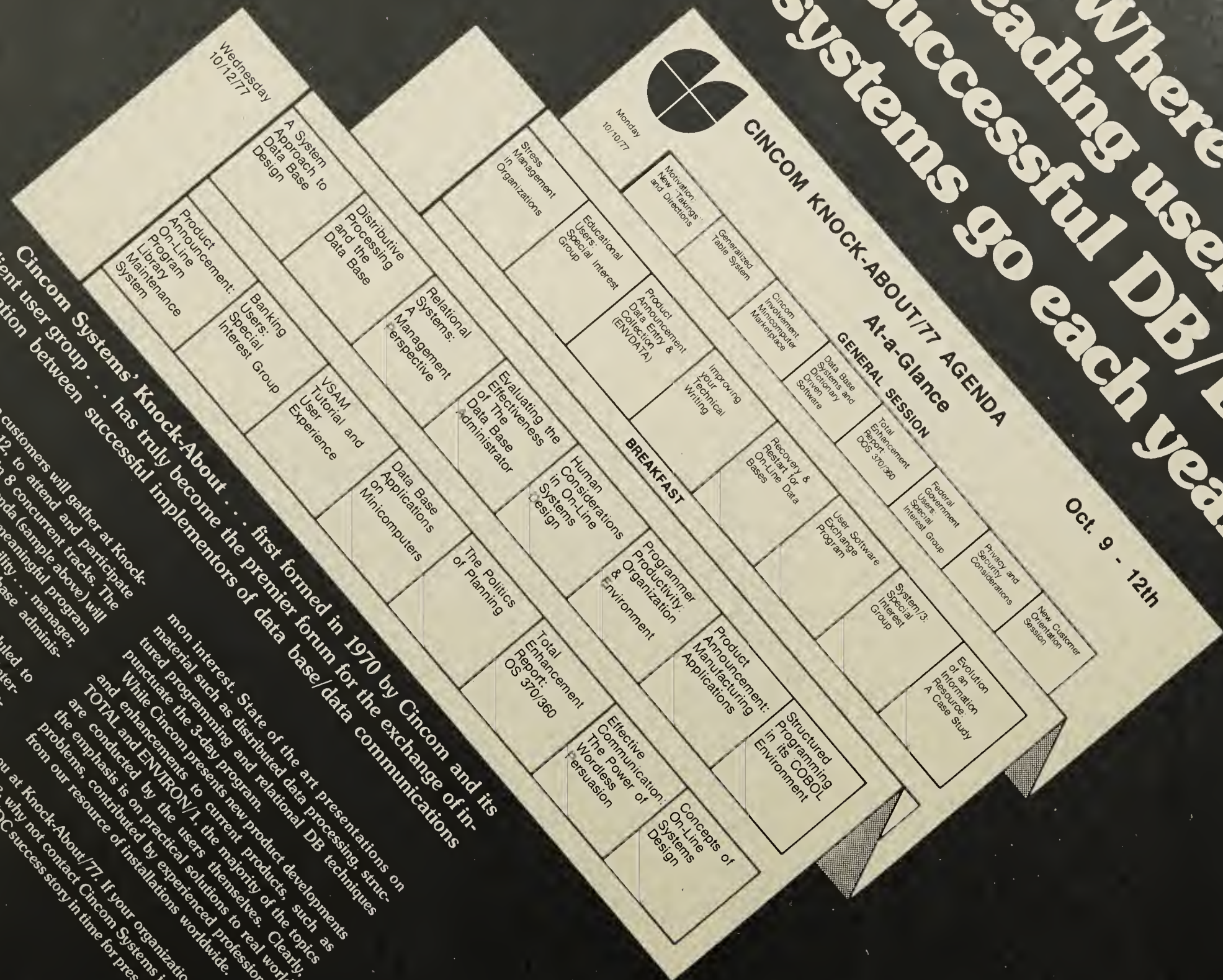

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Special interest groups have been scheduled to provide the opportunity for industry-oriented interaction and in-depth discussions of subjects of common interest. State of the art presentations on material such as distributed data processing, structured programming and relational DB techniques punctuate the 3-day program.

While Cincom presents new product developments and enhancements to current products, such as TOTAL and ENVIRON/1, the majority of the topics are conducted by the users themselves. Clearly, the emphasis is on practical solutions to real world problems, contributed by experienced professionals from our resource of installations worldwide.

If you are a Cincom customer, we hope to see you at Knock-About/77. If your organization is considering data base or data communication software, why not contact Cincom Systems immediately. We can help you prepare your organization's DB/DC success story in time for presentation at the next Knock-About (April, 1978).

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DPMA OKs CDP Special Interest Group

By Don Leavitt
CW Staff

PARK RIDGE, Ill. — The Data Processing Management Association (DPMA) has granted provisional status to a special interest group for Certified Data Processors. Acting president of the group is Beverly Madron, an assistant professor of data processing at Western Kentucky University.

Madron would welcome the names of members of DPMA and others holding the CDP designation who would be willing to help her organize the new group and plan meetings. She said anyone could contact her at Grise Hall, at the university in Bowling Green, Ky. 42101.

"Our initial thrust will be an industrywide education effort to recognize the Certificate in Data Processing (CDP) as a viable and useful mechanism for the individual holder and others to measure the knowledge and competence in our always evolving field," Madron said in explaining why the group is being organized.

The group will be aiming for the type of acceptance toward the CDP that, for example, the CPA enjoys in the field of accountancy. Some companies now encourage employees to work for the CDP; more should and our group will be spending much time spreading the word," she added.

The special interest group will make an effort at coordinating its work "in some way" with that of the Institute for Certification of Computer Professionals (ICCP), the organization that now administers the CDP exam. Madron made no mention of the possibilities of working with the independently organized Society of Certified Data Processors (SCDP).

Exam Preparation

"We plan to become involved in CDP exam preparation courses and review materials," she added, noting there is currently no organized national effort to provide review classes or to review the more and more numerous teaching aids supposedly designed to prepare for the exams.

CCP Confusion

Madron noted also that there has been some confusion over the introduction this fall of a new examination program by ICCP, leading to a Certificate in Computer Programming (CCP) designation for those who pass it.

"For those who believe such additional levels of certification may dilute the prestige of the CDP, there are those who feel just as strongly that such stratification of the broadly inclusive label of data processor will improve the visibility of the CDP, which after all is directly aimed at managerial and similar senior level persons," Madron commented.

The DPMA special interest group also plans to tackle the issue of continuing education after certification. Preparing for the exam is a major educational effort with definite career path advantages. "However," Madron cautioned, "the longer the program is in existence and the more time that passes following certification, the more necessary becomes some form of continuing education. I'm sure the group will address this concern.

According to the association, there is a $10 annual membership fee for the new group, and as long as the group has provisional status within DPMA, members of the special interest group for Certified Data Processors need not be members of the association.

'HSM' Swaps Dasd, MSS File

WHITE PLAINS, N.Y. — An IBM program product, to be available early next year, is said to arrange data efficiently in a storage hierarchy including the IBM 3350 and 3330 direct access storage devices (Dasd) and the IBM 3850 mass storage system (MSS).

The Hierarchical Storage Manager (HSM) package keeps "active" data sets on the faster Dasd units, but moves more dormant ones to the lower cost-per-Mbyte MSS. It also makes backup copies of altered data sets, which can be retrieved on command, according to a spokesman.

The "migration" of data sets between the storage media can occur at a regular time each day or a predetermined time interval that can be more or less than 24 hours. The choice is up to the installation and can be changed with conditions, he added.

As HSM moves the less active data sets to MSS, it frees Dasd space for new applications. Since new projects are often on-line, this resource is generally in critically short supply. Since HSM "backs up" only altered data sets, however, it also saves some resources in that task which can be used for other operations, the spokesman continued.

By managing the "migration" chores without operator intervention — except to set the original parameters — the system also reduces or eliminates media handling and manual data management and backup procedures, he said.

HSM operates with OS/VS2 MVS Release 3.7 on IBM 370/145 and larger CPUs, including the 3033 processor. HSM is compatible with Release 2 of Version 1, Resource Access Control Facility (RACF) data security software and can operate with multiple hosts, he added.

HSM will be available in the first quarter of 1978 for a monthly charge of $350.

'Goes' Runs On-Line

SAN DIEGO, Calif. — The Gemini Order Entry System (Goes) was designed by Gemini Associates for firms with a high volume of customer orders who need to reduce time lags between receipt of orders, shipments of the desired products and subsequent payment of the invoice, a spokesman explained.

Written in Cobol, Goes currently uses Cincom's data base management system Total and teleprocessing monitor Environ-1, but it can easily be adapted to any equivalent systems, Gemini said.

Operating either on-line or in batch, Goes is said to feature customer verification and credit checking, as well as current receivables balances; automatic input to all affected departments; automatic generation of shippers and invoices; product location within stores; finished goods inventory, including product allocation and relief; and an interactive system of prompting correct data entry, a spokesman said.

Goes can be purchased for $20,000 or rented for $550/mo.

Gemini Associates can be reached through P.O. Box 81949, San Diego, Calif. 92138.

'Maps' in Basic-Plus 2

PALO ALTO, Calif. — Ross Systems, Inc. has released Version 2 of its Management Aid for Planning Strategies (Maps) software, a generalized financial modeling and reporting package. Maps operates on a Digital Equipment Corp. PDP-11, using RSTS/E and is available in both Basic-Plus and Basic-Plus 2.

Built around a user language intended for nontechnical people, Maps creates its output from matrix descriptions of the rows and columns desired.

In addition to formatting capabilities, Maps contains a file maintenance system, the ability to ask "what if" questions, and a capability of consolidating reports, the company said.

Maps is offered on a time-sharing basis or can be licensed to operate in-house for a one-time license fee of $10,000.

Ross Systems is at Suite 208, 1900 Embarcadero, Palo Alto, Calif. 94303.

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On-Line Systems Keep Canadians Cars Moving

Special to CW

OAKVILLE, Ont. — An on-line system developed by the Ford Motor Co. of Canada, Ltd. is reportedly helping Ford and Mercury car and truck dealerships throughout this country to provide better customer service, reduce operating costs and maintain precise day-to-day control over the operation of their businesses.

The system, named Dealership Computer Services (DCS) is one of three major on-line systems developed at Ford. The others are Warranty Claims Processing and Accounts Payable. All have been designed and programmed using the facilities provided by Task/-Master, a teleprocessing monitor from Turnkey Systems, Inc. of Norwalk, Ct.

All of Ford's on-line applications operate in a single region of an IBM 370/168 under OS/SVS.

DCS itself consists of three major components: an order entry, inventory control and inquiry system for parts and accessories; a system for ordering new vehicles; and a complete dealership accounting system. Each component is a modular element of the total DCS package, allowing each dealer to selectively implement specific applications based on individual needs.

With DCS, each dealer has direct access to the centralized files of parts and vehicle data maintained by Ford.

Len Sanci, owner of Oak-Land Mercury Sales, Ltd. in Oakville, is very pleased with the success his dealership has had with the system. "It has streamlined our entire operation primarily because it's such a complete package. Through the same terminal we can order cars, order parts, track the status of parts and handle all of our accounting transactions."

One of the biggest advantages of the system, according to Sanci, is in the area of car maintenance and repair, where the availability of a single part can be critical. "In car repairing everything is an emergency. Under the old system, we had to phone in our order, and we didn't know until the delivery truck arrived that a part wasn't available. In the meantime we've tied up a mechanic, tied up a stall and disappointed a customer," he said.

"Now, all we have to do is walk over to the terminal, type the order in and we know immediately whether all the parts are available. If a part we need is out of stock at the distribution center, the system not only tells us where the nearest dealer is who has one in stock, it also lets us know when the next shipment will arrive from the manufacturing plant. That kind of information is invaluable in controlling our shop," he asserted.

Accounting Benefits

Jack Mason, secretary/treasurer of Oak-Land Mercury, reported additional DCS benefits from a financial control and accounting standpoint. "By entering all of our sales, accounts payable and accounts receivable transactions through the terminal, we can keep current on a day-to-day basis," Mason said.

Each transaction entered into the system is checked against the files maintained by Ford of Canada at its headquarters here "Errors are detected immediately and corrections can be made on the spot," Mason noted.

"Under our old accounting system we created a paper tape and had it sent out for processing. We didn't find out about any errors until two days later when the listing came back. In addition, because we're on-line with Ford, we have access to the latest pricing and part number data including 'replaced-by' information that just wasn't available under the old system," he said.

The ability to support "almost every type of terminal on the market" was just one of the reasons that Task/-Master was selected, according to George Ridout, a computer specialist responsible for technical support of Ford's on-line systems. "Probably the major reason we picked the package was because it was a full-feature monitor that would fit on our computer.

"In addition, because we are very performance-oriented, the ability to select only those functions of Task/-Master that we needed through customizing meant our system would operate with minimum overhead," he noted.

Although Ford has since removed some of its storage restrictions in going from an OS/MVT environment to SVS and a larger machine, it still considers Task/Master's basic efficiency a major advantage.

Having a monitor that is easy to work with is also important to Ford. It has allowed development work for new on-line systems to be done by analysts and programmers who were already familiar with the user department's needs, but not necessarily expert in on-line programming.

The on-line applications currently in operation at Ford of Canada are only the "tip of the iceberg" when compared with what the future might bring, according to Gordon Reade, manager of technical systems services. "Advances in technology have allowed us to evolve more and more into an organization that operates in 'real-time,' where as soon as a transaction enters the system at one point, an appropriate response is generated at another. We're not there yet," Reade said, "but the time between an action and a corresponding response is getting smaller and smaller all the time."

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Structured Maintenance — Part I

Approach Trains User to Read 'Alien' Code

By Edward Yourdon
Special to CW

Structured programming, structured design and structured analysis have revolutionized the development of new computer systems in the past few years. Numerous case studies and surveys have documented impressive gains in productivity, reliability and maintainability of these new systems.

But what about existing systems? It is estimated that at least 50% of all software activity in the U.S. is spent maintaining existing systems — and for many large organizations, the figure is closer to 75% to 80%. Most of these systems were developed long before anyone knew about modular programming, structured programming or any other "modern" development techniques — so it is no surprise that they continue, even after 10 years, to be unreliable and difficult to maintain.

So, what can be done to improve the state of affairs for these wretched old systems, with which we must live for another five to 10 years? Fortunately, there is a new discipline emerging, structured maintenance, which is aimed specifically at the technical problems encountered by maintenance programmers. Those problems are usually such things as:

- Nobody remembers specifically what the system is supposed to do, nor does anyone really know with any certainty what the system *does* do.
- It is often difficult to relate specific actions (or outputs) of an existing system to the specific "chunks" of code (we hesitate to use the word module) that produce those actions.
- If a programmer changes code in an existing system, it is almost impossible to know whether any other part of the system will be affected.
- It is extremely difficult, frustrating and unpleasant learning to read "alien" code developed by another programmer.

Components of Method

Structured maintenance includes: techniques to document the structure and interconnections of existing systems; guidelines for reading alien code; guidelines for modifying, retesting and debugging alien code; economic models for deciding when existing systems can profitably be rewritten; manual and mechanical techniques of "restructuring" all or part of an existing system; and the use of walkthroughs and teams to decrease the errors and boredom associated with maintenance.

Most of the documentation techniques have been used successfully for the development of *new* systems; what is interesting is that they are now being used to document existing systems. These techniques include Heirarchy plus Input-Processing-Output (Hipo) and structure charts, data flow diagrams and — in the rare cases where complex, decision-oriented logic has to be deciphered — decision tables.

These techniques have been successful in recent maintenance efforts because the existing documentation is usually obsolete; the existing documentation and/or the existing code presents a "low-level" view of the system, without providing the overview that the maintenance programmer needs so desperately; and the existing documentation almost never warns the maintenance programmer of the subtle interconnections between one "chunk" of the program and another.

Reading Techniques

Structured maintenance also concentrates on techniques for reading alien code — almost as if it were an exercise in archaeology. It is ironic that we train most programmers in "write-only" mode — that is, we train them to *write* computer programs without ever teaching them the nontrivial art of *reading* computer programs. Imagine what things would be like if we taught English, French and Spanish that way!

What does a programmer have to learn to be able to read programs successfully? Perhaps the most important thing to learn is the importance of taking notes. Reading a program usually raises questions that can't be answered immediately or it suggests modifications that the programmer would like to make "some day.".

In our work, we recommend that the maintenance programmer keep five "diaries": bugs, maintainability issues, usability issues, efficiency issues and mysteries and unanswered questions.

Yourdon is chairman of the board of Yourdon, Inc., New York, and author/coauthor of several books on "structured" DP techniques.

'007' Packages Code Data

WILBRAHAM, Mass.— Hansco Data Processing, Inc.'s 007, a user key-controlled encryption/decryption routine, can be invoked by standard calls from application programs on IBM 360/370 CPUs, according to a spokesman.

The routine comes in two versions, Civilian/007 and Federal/007. Both are based on mathematical manipulations ordered by user-supplied 8-byte activating keys, allowing up to 1.7 quintillion possible ciphers, Hansco claimed.

Civilian/007 protects data through a unique two-stage algorithm; Federal/007 is a software implementation of the Data Encryption Standard now required by the federal government for sensitive and valuable data, the vendor explained.

Requiring only 2.5K bytes of main memory, the routine is self-relocating and reentrant and can be used in almost any IBM 360/370 environment. Either version is available in object form for $495; BAL source decks can be provided at additional cost.

Hansco can be reached through P.O. Box 236, Wilbraham, Mass. 01095.

Mini Quarterly Now Two Books

NATICK, Mass. — The *Minicomputer Software Quarterly*, published by International Management Services, Inc. and available for $85/yr., has grown 60% since it was first released a year ago. It is now in two loose-leaf volumes.

The quarterly will continue to be indexed by application area and cross-referenced by minicomputer and by source language, a spokesman said. The book now carries over 500 program descriptions, each covering the product's technical points, the vendor's support, cost of the program and name and location of the vendor.

The publisher is at 215 Oak St., Natick, Mass. 01760.

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Remex launches a PDP-11 floppy disk system with above DEC performance

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REMEX DIVISION

'Centre-US' Data Base Positions 110,000 Places

ELMHURST, Ill. — The latest edition of Centre-US, a magnetic tape-oriented data base of geography for the U.S., contains coordinates and geocodes for 110,000 places in this country, according to Centre Mark Co., the vendor.

Each of the 126-character records contains fully spelled place name, latitude/longitude coordinates and, if assigned, postal Zip Code, Standard Point Location Code (SPLC) and the Dun & Bradstreet state-county-city geocode.

The county records also include square-mile area, bounding rectangle coordinates and Federal Information Processing Standards (Fips) and IBM state-county numeric codes, a spokesman noted.

The file provides geographic logic for many distribution, vehicle control, marketing and automatic mapping programs for a wide spectrum of users. It is updated semiannually so that information such as Zip Codes is reasonably current, he added.

Centre-US can be furnished in most standard tape formats.

The initial tape and the first semiannual update cost $5,000. The subscription service to keep the file up to date after the first year costs $500 annually, Centre Mark Co. noted from 296 Elm Ave., Elmhurst, Ill. 60126.

RCC Net Adds Trades Analysis

PALO ALTO, Calif. — The Trades Analysis feature of the Liquidity Management System (LMS) on the Remote Computing Corp. time-sharing network provides a way of comparing investments in a portfolio with investment opportunities currently on the market, a spokesman said.

In supporting institutional portfolio managers in their trade or purchase decisions, the feature uses a large data base of market prices to determine yields from the purchase of specific investments, including short-term instruments, bonds, GNMA passthroughs and Agency and Treasury issues, he added.

To obtain an analysis, the user specifies the type of instrument desired, the minimum acceptable profit on a trade, the maturity range of purchased investments and their price ranges. The analyses can cover trades between securities of the same type or between securities of different types, the spokesman continued.

Users can refine the definitions of what they want by adding a reinvestment rate for interest income, ineligible security types, pickup-giveup spreads and similar constraints, he said.

The results of the system's analysis are reported as the five "best trades" for any investment now in the portfolio or the five "best buys" with a given instrument type.

Remote Computing has regional offices in the New York City area and in Los Angeles. It is headquartered at 1076 East Meadow Circle, Palo Alto, Calif. 94303.

McAuto Service Runs MDs' Bills

ST. LOUIS — McDonnell Douglas Automation Co. (McAuto) has extended the facilities available under its Hospital Services network to include Physician Data Services (PDS), an interactive financial system to handle accounts receivable and collections for medical groups and clinics.

PDS should help improve cash flows for these users, McAuto said from its headquarters here in St. Louis, Mo. 63166.

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Fortran Code Optimized For Vector, Array Processors

MARINA DEL REY, Calif. — The Vectorizer package from R&D Associates accepts standard Fortran programs and analyzes them to discover statements or sets of statements which can be rewritten to take advantage of vector or parallel architectures, according to a spokesman.

Developed by Massachusetts Computer Associates, the package appears to be useful in connection with either the 7600 or the Star systems from Control Data Corp., the Cray-1 from Cray Research, Inc. or the ASC from Texas Instruments.

The Vectorizer's analysis phase is "extremely machine-independent: it looks for vectorization possibilities without regard for the architecture of the underlying machine," the spokesman said.

During code generation, however, the software "relies heavily" on the target machine's characteristics to produce optimized vector or array sequences, he noted.

Analyst Helps

Although the software produces improved code with no help from an analyst, it also produces diagnostics that enable an analyst to go further, making greater use of the vector or array processing capabilities of the target machine, he added.

In one benchmark that used a finite difference routine which made repeated passes over a large array, the same Fortran source code ran 2.1 times faster on the CDC 7600 and four times faster on the Cray-1 after vectorization than before, he claimed.

For the CDC 7600, the Vectorizer costs $95,000; for Cray-1, the cost is $105,000. Monthly rental agreements are also available from R&D Associates, which can be reached through P.O. Box 9695, Marina del Rey, Calif. 90291.

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Package Eases PCB Graphics

BERKELEY, Calif. — PC50 from Second Source Industries is described as an interactive software package designed to run on the Tektronix 4051 graphics system to produce accurate, camera-ready layout art and documentation for printed circuit boards (PCB).

High-density double-sided or multilayer layouts, up to 30- by 40 in., are generated up to 10 times faster than is possible with common manual methods, a spokesman claimed.

Ground planes; solder mask and silk screen art; and drilling, fabrication and assembly drawings are also produced, he said.

The software works from a data base of PCB elements which can be customized to fit the designers' needs. These elements can be called, oriented, positioned with the system's joystick and displayed on the CRT.

Data is stored and later output to a Tektronix 4662 plotter at any user-specified scale. Editing facilities are said to simplify PCB revision; a special "draw-around" feature, for example, lets users capture and manipulate entire sections of a layout as a single entity, the spokesman noted.

PC50 runs on the Tektronix 4051 with 32K bytes of memory, a joystick and plotter, all of which is available from Second Source. The software itself costs $750 and can be ordered from the vendor at 735 Addison St., Berkeley, Calif. 94710.

Book Covers Documentation

ROCHELLE PARK, N.J. — *Organizing and Documenting Data Processing Information*, a 160-page book written by Thomas R. Gildersleeve, is available in paperback for $7.95.

The publisher is Hayden Book Co., 50 Essex St., Rochelle Park, N.J. 07662.

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'PDMS' Runs Inquiries on Micro

BLACKSBURG, Va. — The interactive Personal Data Management System (PDMS) from Microwave Division of PBS Ltd. allows an Altair 8800B user to store, modify and retrieve information from floppy disks directly through a command language or through exits from Basic programs, according to a spokesman.

The data available to the user under PDMS can be a mixture of character fields or "triple-word" length integers, he said. Searches can be for specific information or for matches — or near-matches — of character strings, he added.

The commands available are in English; an operator with only secretarial skills can usually be trained in its use in less than an hour, the company claimed.

32K Memory

The current PDMS implementation is for the Altair 8800B with one or two floppy disks and a minimum 32K memory. Additional versions for cassette systems and for systems based on other microprocessors are under development.

Application packages utilizing PDMS as an access system are also being developed, Microwave said.

PDMS is available on an 8-in. floppy disk for $795. The package incudes a user's manual which contains a source listing of the program, Microwave said.

The company can be reached through P.O. Box 47, Blacksburg, Va. 24060.

Datapro Discusses DBMS

DELRAN, N.J. — "Data Base Management Systems: General Concepts and Planning Guidelines," a seminar for management personnel, data base administrators and systems planners, will be offered this fall by Datapro Research Corp.

The course will explain what data base management systems (DBMS) are all about and where their real economic advantages lie, a spokesman stated.

Costing $425 for Datapro subscribers and $475 for others, the seminars will be given in New York Sept. 28-30 and in late November; in Washington, D.C., on Oct. 12-14 and in December; in both Philadelphia and San Francisco Oct. 26-28; and in Chicago on Nov. 9-11.

Datapro is at 1805 Underwood Blvd., Delran, N.J. 08075.

'Isum,' Nova For Doctors

TRENTON, N.J. — A patient billing, accounting and payroll package for physicians' offices has been developed in Fortran by Isum for use of a 32K Data General Nova.

The facilities of the system are also available from Isum as a customized service, a spokesman added.

Hardware

The recommended hardware configuration includes a Micronova with 32K memory, 10M bytes of diskette storage, a Dasher printer and a CRT. Isum offers that system for $17,000 and the software for an additional $12,000.

Cost of the customized service, done here, is primarily a function of the volume of transactions, the spokesman explained from Isum's offices at 53 N. Post Road, RR1, Trenton, N.J. 08648.

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ADABAS	3.6	3.4	3.7	3.7	2.3	3.2	2.4
IMS	2.9	2.4	2.2	2.5	2.8	2.8	2.9
DL-1	2.6	2.4	2.3	2.4	2.4	2.5	2.6
IDMS	3.8	3.3	3.4	3.6	3.0	3.6	3.5
SYSTEM 2000	3.0	2.6	3.0	3.0	2.5	3.0	3.0
TOTAL	3.5	3.1	3.4	3.4	2.8	3.0	2.8

All figures based on latest available Datapro survey.
*All weighted averages are based on a scale of 4.0 for excellent.
Courtesy of Datapro Research Corporation, Delran, N.J. 08075

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September			
Chicago	Wed.	Sept.	7
Seattle	Tues.	Sept.	13
San Francisco	Thur.	Sept.	15
Denver	Tues.	Sept.	20
Phoenix	Thur.	Sept.	22
Milwaukee	Thur.	Sept.	29
October			
Minneapolis	Wed.	Oct.	5
Dallas	Tues.	Oct.	11
New York	Tues.	Oct.	11
Atlanta	Thur.	Oct.	13
Hartford, CT	Tues.	Oct.	25
Salt Lake	Thur.	Oct.	27
Rochester, NY	Thur.	Oct.	27
November			
Portland, OR	Tues.	Nov.	1
Indianapolis	Wed.	Nov.	2
Des Moines	Wed.	Nov.	9
Boston	Thur.	Nov.	10
Rochelle Park, NJ	Tues.	Nov.	15
White Plains	Thur.	Nov	17
Philadelphia	Tues.	Nov.	22
Houston	Tues.	Nov.	29
Albuquerque	Wed.	Nov.	30
December			
Miami	Thur.	Dec.	1
Cleveland	Tues.	Dec.	6
Pittsburgh	Thur.	Dec.	8
St. Louis	Tues.	Dec.	13
Cincinnati	Thur.	Dec.	15
January			
Detroit	Tues.	Jan.	17
Columbus, OH	Thur.	Jan.	19
Memphis	Tues.	Jan.	24
Washington, DC	Thur.	Jan.	26
Kansas City	Tues.	Jan.	31
February			
Nashville	Thur.	Feb.	2

DBMS Project Previewed

SCHILLER PARK, Ill. — A multimedia training package called "The Data Base System Project," now available from Deltak, Inc., is the first of a series of courses called "Developing Data Base Systems," a spokesman said.

The series includes the major steps involved in the design and development of a data base system up to, but not including, programming. The "Project" package can be used to train those responsible for starting and controlling a project, he said.

The first course in the package introduces the seven major steps in a data base project, and the second course shows how to carry out the planning phase.

The package is available for purchase or for rent under Deltak's Resource 12 library plan, he said from 9950 W. Lawrence Ave., Schiller Park, Ill. 60176.

'Tell-A-Graf' Eases Chart Chores

SAN DIEGO, Calif.— The Tell-A-Graf software from Integrated Software Systems Corp. (Issco) enables clerical, non-DP trained personnel to generate "publication quality" graphics on any vector-mode graphic device linked to an IBM 370 running under OS/-VS, the vendor said.

The package does this, a spokeswoman explained, by combining a high level language processor interpreting English-like commands with the company's current Dissplа graphics system software. Tell-A-Graf simplifies the commands needed to generate the graph and includes editing capabilities, she noted.

Once the user has provided formatting instructions and the data to be graphed, the system creates legends, if desired, and scales axes to fit the data. It positions headings and axis labels without operator intervention, she said.

Although still in Beta-test operations at selected user sites, with general release "about six months away," Tell-A-Graf is now available on the National CSS, Inc. remote-computing network, based in Norwalk, Conn.

When it is ready for distribution, the package will cost $19,500, Issco said from Suite G, 4186 Sorrento Valley Blvd., San Diego, Calif. 92121.

Loader Ready For CA Syfas

IRVINE, Calif. — A downline software loading capability now available from Computer Automation, Inc. permits users of the company's Syfa systems to transmit application programs and system software throughout a distributed network from a central point, according to a spokesman.

The transmission support has several advantages, he said. Among them are faster distribution of software as it is developed, better backup in case of machine failure and program loss at remote sites and simplified handling of software at the central site as it is being prepared for shipment to the other locations, he claimed.

The new utility, which is free to any synchronous communications-equipped Syfa user, permits loading of either source or object programs at the remote sites. Transmission of source code requires availability of a compiler at the remote location if the program is to be made operational by the staff there.

Computer Automation is at 18651 Von Karman, Irvine, Calif. 92713.

Cassettes Teach BAL for IBM 3

BOWIE, Md. — "Basic Assembly Language Programming for the IBM System 3," a self-instructional package consisting of six audio cassettes and a workbook, requires no prior knowledge of BAL, according to the vendor, the Robert J. Brady Co.

Students are introduced to number systems and basic data concepts. Building on this foundation, the course includes laboratory sessions to be run on an IBM 3, sample printouts, an Ebcdic conversion chart, a hexadecimal addition table and a list of mnemonics, a spokesman said.

The course concludes with a section on subroutines and an appendix outlining a range of debugging tips. The complete package is available for $250 from Brady here in Bowie, Md. 20715.

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TASK/MASTER	3.3	3.2	2.8	3.3	2.5	2.7	2.7
ENVIRON 1	3.1	3.1	3.2	3.1	2.3	2.5	2.5
CICS	3.1	2.8	2.4	2.8	2.8	2.9	2.8
INTERCOM	2.7	2.8	2.2	2.5	2.1	2.1	2.5
IMS/DC	2.8	2.5	2.4	2.5	3.0	2.9	2.8

*All weighted averages are based on a scale of 4.0 for excellent. Courtesy of Datapro Research Corporation, Delran, N.J. 08075

All figures based on latest available Datapro survey.

Here's why our users rate DATACOM/DC so high:

"In terms of total satisfaction, DATACOM/DC measured up completely to what we wanted and gave us more than we expected."
—David Hughes, Manager of Systems and Programming, Mass. State Lottery.

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—Gary Dyer, Data Processing Director, Blue Cross of Idaho.

"DATACOM/DC was extremely easy to install and we had no TP experience."
—David Harp, Director of Data Processing, New Castle County, Del.

"My programmers say DATACOM/DC is very easy to use; as simple as writing a COBOL program. The documentation also is very good. Technical enough for the technical people yet simple enough for management people to understand."
—Harvey Kennedy, Vice President and Director of Management Systems, Southern Baptist Annuity Board (Dallas).

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—Ben Driver, Data Base/Data Communications Software Manager, Brockman On-Line Systems (Houston).

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Math Drill, Practice Uses HIS Level 66 CPU

WALTHAM, Mass. — Schools with Honeywell Information Systems, Inc. large-scale Series 6000 and Level 66 systems can help their math teachers through installation of the Individualized Mathematics Instruction (IMI/66) package from HIS.

The software consists of an integrated set of programs that function as an arithmetic drill and practice system and as an arithmetic test generator.

It also maintains student records dealing with individual and class achievement, enabling the instructor to provide more personal attention to each student, a spokesman said.

IMI/66 does not include any facilities with which an instructor could write any new examples for drill and practice. A "systems-type" person might be able to get into the code, however, and replace some of the current problems with new ones, he said.

The basic system provides a student with drill practice while he is at a terminal connected to the large-scale CPU. Problems can be displayed or printed for student response; the program compares the response with correct answers, replies to the student and presents another problem.

The interactive test-generation system produces tests covering the basic skills of arithmetic. Controlled by the instructor, this portion of the system can tailor tests for each student, building them of any combination of problems selected from 210 learning objectives, the spokesman said.

Written in Fortran, IMI/66 evolved from Model 1600 and Model 400 time-sharing systems. It requires 26K words of main memory and runs in time-sharing mode under HIS Gcos environment.

The math package is available in source and object code form on a fully paid-up license for $1,900, HIS added from its Inquiry Center, 200 Smith St., Waltham, Mass. 02154.

Micro Program System Includes Disk Hardware

SANTA CLARA, Calif. — A "universal" microprocessor development system that includes a dual-floppy disk drive, an interface circuit subsystem card, a read-only memory (ROM) card containing firmware and a disk operating system on a diskette, the IPC-16P/840 package is available from National Semiconductor Corp.

Initially designed for use with National Semi's Pace units, the system can be used with the company's SC/MP and other microprocessors as well, a spokesman noted.

The operating system includes a file management capability, support for assembly programs, editors, linking loaders, utility programs and diagnostic routines, he added.

It can be installed on any IPC-16P Pace development system with 12K words of random-access memory and heavy-duty power supply.

The interface card and the ROM card can be inserted in "any available slots" in the Pace system. The interface card provides protocol for the dual disk drive and an optional CRT: firmware, located on the card, operates the disk mechanisms, formats data and controls data transfers, he said.

A ROM-resident monitor provides the user wth control over system configuration and program execution. Single-word commands supply linkage to paper tape loader, card reader loader, diskettes and a debugging subsystem, the spokesman said.

The complete IPC-16P/840 package, including the disk drive, costs $4,500. Delivery is 30 days after receipt of order, National Semi's Microcomputer Systems Group said from 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

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Bank Installs Direct Link to 'Fed' CPU

By Stewart M. Shacter
Special to CW

ST. PAUL, Minn. — The First National Bank of St. Paul here has developed a processor-to-processor link between its minicomputers and the Federal Reserve Bank's communications switch in Minneapolis.

This link is between the bank's Digital Equipment Corp. PDP-11 processors and the "Fed's" IBM 370/145 with an IBM 3704 front end.

The direct communications link has increased the efficiency of transmitting financial data through the Federal Reserve System by allowing a greater transaction volume without an increase in staff size. For example, the bank has increased the daily number of transfers from 450 to 600, totaling an average of $600 million.

In addition to dropping the per-unit cost of each transfer through the Fed by 30%, the system has provided better service to St. Paul and its customers, permitted greater accuracy of data and, therefore, increased the security of the system.

Application System

The bank uses computer communications in its funds transfer operations, and the Federal Reserve Communication System (Fed Wire) is a major route for domestic money transfers.

Until recently, all electronic links between member banks and the Federal Reserve regional centers were terminal-oriented, with paper tape readers at member banks providing the fastest interface available.

To efficiently handle the increasing volumes of funds transfers, it became necessary to replace this terminal interface with higher speed processor links.

The First National Bank had previously developed a minicomputer-based Fed Write application system. Running a a PDP-11/45 RSTS system, the application programs provide for data entry, internal controls, management reports and an interface to the checking system.

This application system, installed in June 1975, greatly reduced the internal handling time for the processing of Fed Wires. The interface with the Fed was accomplished by having the system punch a paper tape that was input into a paper tape reader tied directly to the Federal Reserve Bank's equipment.

The automated application and the computer-assisted terminal link served the bank until the volume of transfers began to approach the functional capacity of the terminal. At that point, the bank began to study the feasability of a direct processor link to its Federal Reserve regional communications switch.

Linking the application processor directly to the Fed system was initially considered the best approach for establishing the link. However, it was quickly proven the time-sharing system could not efficiently handle both the application and communications.

Further, not only did the bank want an inexpensive system, but one which was versatile enough to be expanded for future needs. Commercially available message switching "front ends" which were studied were either too expensive or too inflexible.

User in Control

The bank decided to purchase a PDP-11/10 processor and write the communications software in-house. This software, which runs stand-alone on the processors, provides all the necessary functions normally associated with an operating system such as device handling, line protocol support and dynamic management of available memory.

As a front end for the PDP-11/45 RSTS application computer, the PDP-11/10 acts as a buffer, protecting the user-oriented RSTS system from the constant interrupts of external communications lines.

Since the RSTS system controls the communication line between itself and the front end, the movement of information between the PDP-11/45 and PDP/11/10 does not degrade the service given to terminal users of the time-sharing system.

Special features above the necessary communication facilities were included to allow for strict control over the communications lines. From the application terminals operators can "disable" communications, causing the front end to refuse all requests from outside networks.

Currently, the Fed Wire network is the only system to which the bank's frontend is linked. Other funds transfer networks are beginning to allow for processor-to-processor links, and the front end could be modified to handle them also.

Down-Line Loading

A significant savings was realized by down-line loading the communications software from the 11/45 to the 11/10. This means that the communications program is stored on disk on the 11/45.

(Continued on Page 50)

Correction

NCR Corp.'s Distributed Network Architecture (DNA) [CW, Aug. 22] is not based on the CCITT X.25 protocol recommendation, but will provide the means to derive links from public data networks based on X.25. In addition, NCR will make a commitment to be compatible with non-NCR communications and networks; the company will announce this month how the 721 communications processor, which "has been in existence for some time," will fit into the DNA concept.

Serial Box Holds Alpha Bits

LANHAM, Md. — The Serial Box is a portable, interactive terminal capable of interfacing to mini- or microcomputers through its RS-232 or current-loop port, according to its vendor, Computer Operations, Inc.

The terminal comes in two versions: the CO-4410 and the CO-4420, both of which can transmit data at selectable speeds from 110- to 9,600 bit/sec.

The CO-4420 consists of a direct-access tape drive with a capacity of 1M byte, a full Ascii keyboard, 40-character plasma display, the RS-232 interface and a microprocessor controller, Computer Operations said.

The CO-4410 does not come with the display or keyboard. It was designed to add direct-access mass storage capability to any CRT or hard-copy terminal via a second RS-232 or current-loop port, the firm noted.

The Model 4420 was designed for noncomputer room enviroments and in applications such as data loading/logging in

Serial Box

the field, oil exploration and medical and university environments.

Prices are $3,850 for the Model CO-4420 and $2,850 for the CO-4410. Computer Operations is at 9700-B Palmer Highway, Lanham, Md. 20801.

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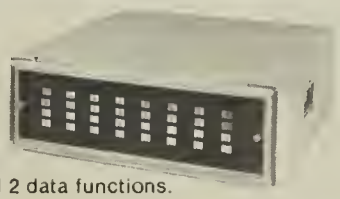

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Harris 1600 Gets Floppies

DALLAS — Harris Corp. has added flexible disk storage for its 1600 family of remote batch terminals and distributed processing systems.

The 1600 diskettes can be advantageous in remote data collection store-and-forward applications employing IBM 3741 or equivalent technology, according to a spokesman for Harris' Data Communications Division here.

The diskettes can be used for mass storage autoload (initial program load); 3741-compatible read; and media conversion such as diskette-to-print, diskette-to-tape and diskette-to-cartridge disk, he said.

As many as three controllers and nine flexible disk drives can be used with larger 1600 systems to provide up to 2.2M bytes of flexible disk storage. Each diskette has a capacity of 1,898 128-char. records for a total of 242,944 char. per diskette, the spokesman noted.

The diskettes can operate under Harris' Communications Operating System (COS) or Extended Communications Operating System.

Either system can process single or multivolume diskettes. IBM 3741-compatible data sets may be processed and transferred without regard to multivolume indicators, volume sequence or end-of-file indicators, Harris claimed.

The Harris 1662 flexible disk controller and F662 flexible disk drives can be purchased for $2,200 each. A three-year lease for a single controller and drive, including maintenance, is $105/mo, the spokesman noted from 11262 Indian Trail, P.O. Box 44076, Dallas, Texas 75234.

Unit Allows Speed Upgrade

ROCKVILLE, Md. — Syntech Corp. has introduced the MPB-200C, a character-oriented converter/buffer said to allow most asynchronous communications systems to be upgraded to the higher speeds of synchronous operation.

The device can be used in terminal-to-terminal or computer-to-terminal applications operating on the dial-up network or on point-to-point and multipoint private lines, according to Syntech.

It will operate in full- or half-duplex modes as well as in a simplex mode on two- or four-wire lines as required by the attached modem, a spokesman noted.

In operation, the MPB-200C accepts machine- or hand-keyed data in an asynchronous character format at transmission speeds from 1,200- to 9,600 bit/sec. It accepts synchronous data from the modem receiver and delivers it to the terminal or CPU in the original format, but at the higher transmission rate, Syntech said.

The converter/buffer requires no adjustments except for the selection of the desired operating speed, according to the firm. It comes with an EIA cable and interface and costs $500, the spokesman said from 11810 Parklawn Drive, Rockville, Md. 20852.

Bank Links CPU Directly to Fed

(Continued from Page 47)

Whenever it is necessary to reload the system (because of testing or failure recovery), a new copy of the communications program is sent down the communications line to the 11/10, where it is loaded into memory through use of a down-line loading bootstrap.

Because this procedure is needed only rarely (perhaps twice per month), the four- to five-minute reload time is not a factor. However, because it eliminates the need for disk space on the front-end, the resulting system is cheaper and more reliable.

Finally, the ultimate point of interaction between the application system and the communication system had to allow both systems controlled access to the relevant information.

A program running in "detached" mode on the application computer continually monitors the application transaction files for outgoing messages and periodically polls the front end for incoming messages.

Outgoing messages are not transmitted until the users "release" them after performing application balancing procedures. Incoming messages are immediately put into the application transaction files, where they are available for review by the users.

For the systems now implemented, the Digital Data Communications Message Protocol (DDCMP) is used between the two in-house DEC computers, and the IBM 2740-2 protocol is implemented between the bank and the Federal Reserve district switch in Minneapolis.

The front end software is written in Macro, the assembler language of PDP-11 processors. The communications handler for the RSTS system is written in a high-level language developed by the bank to provide for facilities not available in the DEC Basic-Plus language. The code is translated into standard Basic-Plus for execution.

The PDP-11/45 RSTS mini supports a variety of applications including a securities trading and accounting system and a federal funds information system. It is anticipated that these current and other future systems will make use of the new communications facilities.

Implementation of the system has resulted in both cost savings and operational advantages.

Shacter is senior systems analyst at the First National Bank of St. Paul. He is responsible for the design and implementation of various financial systems, including the new front-end communications system.

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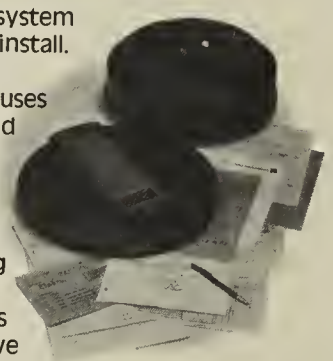

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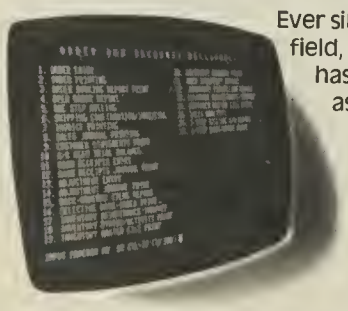

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Chip Controller Converts Data To SDLC, HDLC and ADCCP

HAUPPAUGE, N.Y.—Standard Microsystems Corp. (SMC) has introduced a programmable MOS/LSI chip controller that places data in IBM's Synchronous Data Link Control (SDLC) and other high-level protocols.

The COM 5025 controller is a 40-pin monolithic integrated circuit utilizing an n-channel silicon gate process that can replace up to 300 integrated circuits and operate at speeds up to 2M bit/sec, SMC said.

The controller was designed for OEMs, but end users can utilize it in their systems' components with appropriate software changes or additions, according to a spokesman.

The device is a universal transmitter receiver for dedicated control and implementation of all major protocols including bit-oriented types such as SDLC, Higher Level Data Link Control (HDLC) and the Advanced Data Communications Control Procedure (ADCCP), as well as byte-oriented protocols such as Bisynch, SMC claimed.

The COM 5025 is the first programmable chip controller approved for these protocols and the only one that can process both SDLC and HDLC protocols, according to SMC.

Compatible with 8- or 16-bit processors, the TTL-compatible unit contains selectable protocols and a tristate I/O bus, SMC said.

Double Buffering

The data, status and control registers are double buffered. Full- or half-duplex operation is provided by means of independent transmitter and receiver clocks, the spokesman added.

Data lengths are individually selectable for receiver and transmitter from 1- to 8 bits. Data, status and control registers are linked to a master reset which reportedly initializes them to the SDLC protocol on power-up.

The controller of the device is responsible for all higher level decisions and interpretation of some fields within message frames, SMC stated.

For bit-oriented protocols such as SDLC, HDLC and ADCCP, the COM 5025 provides bit stuffing and stripping, automatic frame character detection and generation and residue handling, SMC said.

Options for bit protocols include variable-length data (1- to 8-bit bytes), error checking — 16-bit polynomial cyclical redundancy character (CRC) or CCITT, primary or secondary station address mode, extendable address field to any number of bytes, extendable control field to 2 bytes and idle mode to transmit flag characters or mark the line.

For byte-oriented protocols, the COM 5025 features automatic detection and generation of Sync characters. Options such as variable-length data, variable Sync characters (5-, 6-, 7- or 8 bits) and error checking (16-bit polynomial CRC or CCITT, as well as odd/even parity, deletion of leading Sync characters after synchronization and an idle mode to transmit Sync characters or to mark the line are also provided, SMC noted.

The multiprotocol controllers cost $94 each in single quantities and $62 each in quantities of 250, the spokesman noted from SMC at 93 Marcus Blvd., Hauppauge, N.Y. 11787.

Conference to Mull SNA

CAMBRIDGE, Mass.— A two-day conference on the impact of IBM's Systems Network Architecture (SNA) will be held Sept. 20-21 in New York by The Yankee Group.

Aimed at "users who must make white-knuckle decisions over the next year" related to SNA, the conference will include discussions on such topics as the mainframe goals of SNA; growth in networking; transmission facilities to be offered by Satellite Business Systems; terminal trade-offs; and considerations of the large user.

Called "The IBM Grand Design: SNA, SDLC and SBS," the conference will be held at the Harvard Club in New York. Registration for the two-day meeting is $550. Further details are available from The Yankee Group, Box 43, Cambridge, Mass. 02138.

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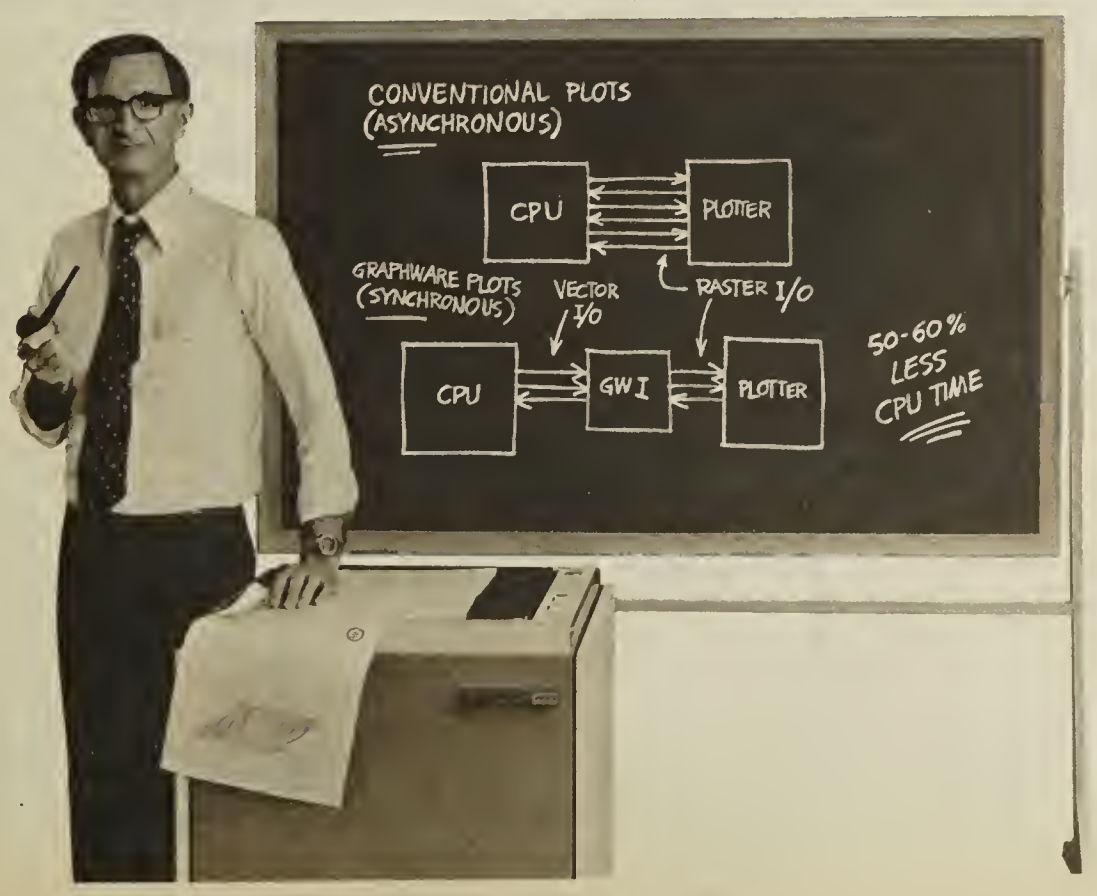

Controller Eliminates TTYS

CHATSWORTH, Calif. — The Model 180 multichannel data logger from Micom Systems, Inc. is an intelligent terminal controller that reportedly permits up to eight pieces of test equipment, each producing a printed output log, to share a single teletypewriter (TTY).

The Model 180 is equally suited for use with computer systems, data concentrator systems, switching systems or any other type of intelligent asynchronous controller provided with a statistics output or operator's console interface, Micom said.

Each of the operator's console or test equipment log output interface is connected to one of eight ports on the Model 180; each of the ports is capable of receiving messages concurrently at up to 300 bit/sec, according to the firm.

The port connecting the terminal is switch-selectable to operate at 110-, 150-, 300- or 1,200 bit/sec.

The terminal used with the controller/logger can be attached remotely through modems, permitting a single terminal using one telephone line to monitor several remotely located pieces of equipment or intelligent controllers, Micom noted.

The device comes with serial asynchronous RS-232C channel interfaces; current loop interfaces are also available, a spokesman noted.

The Model 180 multichannel data logger costs $2,600 from Micom at 9551 Irondale Ave., Chatsworth, Calif. 91311.

Oscilloscope/Terminal Duo Processes Waveform Data

BEAVERTON, Ore. — Tektronix, Inc. has introduced a waveform processing system consisting of its digital processing oscilloscope and the Tektronix 4051 intelligent graphics terminal. The system provides waveform acquisition, digitizing, processing and display of the data.

Tektronix Waveform Processing System

The digital processing oscilloscope portion of the system is based on the 250 MHz Tektronix 7704A oscilloscope. Waveform digitizing and data storage facilities (512 data point/trace) for up to four traces are added to the basic oscilloscope, the company said.

The digitized waveform is displayed on the 7704A's CRT along with alphanumeric messages such as waveform scale factors.

Broad waveform acquisition capabilities are available by selecting from the 7000 series of amplifier time base, spectrum analyzer, digital multimeter and counter plug-ins, Tektronix noted.

Waveform calculations such as addition, multiplication, integration, differentiation, fast Fourier transform, inverse Fourier transform are performed on the 4051 intelligent terminal using the Plot 50 programming language.

Up to 32K bytes of working memory are available on the 4051 plus a 300K-byte cartridge tape unit. Other features include 20 user-definable functions, 10 line editor functions, a 128-character Ascii keyboard with upper and lower case, and IEEE 488 1975 interface, Tektronix stated.

Price of the system with the digital processing oscilloscope, 4051 intelligent graphics terminal and 32K bytes of memory is $28,505.

The 4631 hard-copy unit adds $4,295 and the data communications interface for the 4051 costs $1,500. The system has a 20-week delivery schedule from the firm, which can be reached through P.O. Box 500, Beaverton, Ore. 97077.

Qualterm Unit Portable

MOUNTAIN VIEW, Calif. — Qualterm Terminals has introduced two portable desktop versions of its daisy wheel-equipped 55 char./sec communications terminal for business data communications applications.

The keyboard/printer QT-P55 and the receive-only QT-R55 have been reduced in size and weight to less than 50 pounds, Qualterm said.

Transmission speed can be either 600- or 1,200 bit/sec.

The QT-P55 costs $4,450 and the QT-R55 costs $4,200; lease prices are $131/mo and $124/mo respectively on 27-month plans.

The firm is at 453 Ravendale Ave., Mountain View, Calif. 94043.

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GDC Extends Line With Multiplexer, Modems

WILTON, Conn.— General Datacomm Industries, Inc. (GDC) has extended its communications product line with the introduction of a time-division multiplexer (TDM) and two modems.

The TDM-1253 multiplexer has the capacity for up to 12 data channels and can handle synchronous, asynchronous and isochronous data at channel speeds from 50 bit/sec to 72 bit/sec, according to GDC.

The multiplexer has local and remote system and channel alarms and diagnostics; it is said to accommodate high-speed lines from below 2,400 bit/sec up to 300 kbit/sec.

The unit can operate on voice-grade lines, wide-band circuits, satellite links and digital transmission networks including Bell's Digital Dataphone Service, GDC said.

Two optional circuit cards can be added to expand the capability of the TDM-1253: a plug-in test card to monitor and display the high-speed aggregate data stream error rate and, in systems where EIA controls are not required, a remote alarm and loopback card to provide remote alarm and test functions.

LSI Modems

In addition to the multiplexer, GDC also introduced two modems with LSI circuitry.

The GDC 2400 EP is a synchronous modem that can handle data transmitted at 2,400 bit/sec over two- or four-wire leased lines. It offers CCITT compatibility and has optional remote diagnostics for point-to-point and multipoint applications, signal loopback capabilities and a modem self-test function, according to the firm.

An optional synchronous remote control (SRC) plug-in module reportedly extends the remote diagnostic capability of the modem in multipoint applications.

GDC's 1200 EP modem functions asynchronously at speeds up to 1,200 bit/sec and synchronously at 600- or 1,200 bit/sec in half- or full-duplex modes over leased lines in point-to-point and multipoint applications.

Standard features of the 1200 EP include signal loopback diagnostics, selectable request-to-send/clear-to-send delays, selectable carrier detect levels and local and remote transmission speed control.

In synchronous applications, an optional SRC is available that is addressable from the central site to accept and decode diagnostic commands.

Both modems are available in stand-alone or rack-mounted configurations. The 2400 EP costs $1,072 and the 1200 EP costs $671. The SRC module for either modem costs $214.

The TDM-1253 multiplexer is priced at $1,950. GDC is at 131 Danbury Road, Wilton, Conn. 06897.

New from Diablo: 1200 Baud/200 cps Matrix Terminal.

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We're offering the most versatile 1200 Baud hardcopy terminal available. Our new Matrix Terminal prints 200 cps, has a 100% duty cycle 7 x 9 dot matrix head, that prints upper and lower case. We are microprocessor-controlled to provide incremental and "automatic" bidirectional printing, unique horizontal and vertical tabbing and extensive margin controls. We also offer program control multiple fonts, control code functions and versatile forms handling. We communicate in ASCII code, and are compatible with Bell 103A, t13A, 202 and 212 modems and other 110 to 1800 Baud asynchronous modems using the RS 232C interface, and we print an original and five or more legible copies of all 94 ASCII characters. A nice plus: our table-top terminal has the features and friendliness of an office typewriter. The rest comes from a demonstration! Call your Diablo representative or write Diablo Systems, Inc., 545 Oakmead Parkway, Sunnyvale, Ca. 94086, or Diablo Systems, S.A., Avenue de Fre, 263, 1180 Brussels, Belgium or Mitsui & Co., Ltd., 2-1 Ohtemachi 1-Chome, Chiyoda-ku, Tokyo.

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Transactor I Is CRT Alternative

GRANDVIEW, Mo. — Computerwise, Inc. has introduced a small alphanumeric display terminal designed as an alternative to a CRT.

The Transactor I consists of a single-line, 32-character gas

Transactor I

discharge display with a 5 by 7 dot matrix and a 53-key teletypewriter-style keyboard.

It can be attached to computers with an RS-232 or 20mA current-loop interface.

Switches allow the user to select the operating mode including 110- to 9,600 bit/sec transmission; full or half duplex; even/odd or no parity; five to eight data bits; and one or two stop bits, Computerwise added.

Applications include retail sales, hospital patient accounting, general accounting, inventory control, computer programming, production control and instrument monitoring, according to the firm.

Price of standard Transactor I in quantity is $595. Computerwise is at 4006 E. 137th Terrace, Grandview, Mo. 64030.

292-Page Revision

Auberbach Updates Terminal Book

By John P. Hebert
CW Staff

PENNSAUKEN, N.J.— Because it is difficult to determine exactly what an intelligent terminal is, Auerbach Publishers, Inc. has updated its "Guide to Intelligent Terminals" to include "the genuinely intelligent terminals."

According to the 292-page guide, an intelligent terminal is one that can be programmed to perform certain functions that would otherwise require the services of the CPU. to which it is attached.

After explaining what comprises an intelligent terminal, the publication considers terminal system procurement and describes qualities users should evaluate carefully.

It then devotes 251 pages to a description of each terminal chosen for the report, usually including an overview, the terminal's compatibility with host CPUs, its performance, user reaction, system design and peripheral equipment availability. It then usually describes data communications particulars, available software, maintenance and pricing for each vendor's intelligent terminal offering.

Some of the above categories are absent.

Overall, the publication would help users narrow the choices of available intelligent terminals.

It costs $24.95, Auerbach said from 6560 N. Park Drive, Pennsauken, N.J. 08109.

Terminal Transactions

Tape Terminal Announced

CINCINNATI — LeBlond, Inc. has a punch tape communications terminal which it said can prepare, edit and duplicate numerical control program or machine tapes under microprocessor control.

The DPS-4000 can read, punch or convert EIA, Ascii or Binary codes. It can punch foil-laminated tape or other materials at a speed of 75 char./sec while providing tape verification with a read-after-punch feature, LeBlond claimed.

The terminal can communicate with time-sharing networks at 10-, 15- or 30 char./sec and can reduce time-sharing costs by performing editing and storage functions usually done by the time-sharing computer system, according to the firm.

A maintenance and training support program is offered by the company, including a library of hardware self-diagnostic routines, LeBlond noted.

Prices for the tape terminal start at $6,750, the company said from Madison at Edwards Road, Cincinnati, Ohio 45208.

IEE Has 14-Member Family Of Plasma Display Units

VAN NUYS, Calif. — Industrial Electronic Engineers, Inc. (IEE) has announced a 14-member family of alphanumeric plasma display subsystems called Argus.

The IEE-Argus display subsytsems utilize message panels to provide a display of characters in 5 by 7 dot-matrix format with standard underline and cursor capability, the company said.

The 14 subsystems make up two series — "mini" or "maxi" — that are distinguished primarily by different character sizes and consequent overall size, weight and power consumption.

Character sizes available are .21 in., .25 in. and .33 in. Models are available in character capacities of 32 (16x2), 64 (16x4), 128 (32x4) and 256 (32x8), IEE said.

All subsystems are available in either neon-orange or green. Synchronous, asynchronous and addressed-location loading modes reportedly promote versatility and straight-forward interfacing.

All signal inputs and the one output are TTL, and no intricate signals or critical timing is required, the company claimed.

Each system is compactly housed with multiple mounting methods provided. Optional accessories such as universal input power supplies, contrast enhancement filters, mating connector, cable assemblies and serial data converters are available.

Prices for the Argus family range from $80 to $900, IEE said from 7740 Lemona Ave., Van Nuys, Calif.91405.

Voice-Response Terminals Suited for Pocket, Desk

ANN ARBOR, Mich. — Interface Systems, Inc.(ISI) has introduced a family of voice response Touch-Tone-type terminals.

The T-16 is a pocket-size 16-key numeric terminal and the T-48 is an alphanumeric desktop terminal which includes a volume control and a headset jack.

The T-48 uses a programmable read-only memory (Prom) for storing user-specifiable Touch-Tone codes, according to ISI.

Tone signaling is the standard "two of eight," which is said to be compatible with AT&T models 403 and 407 data sets.

Prices for the T-16 begin at $92. The T-48 with the volume control and headset jack costs $425. Without control or jack it costs $350, an ISI spokesman noted from 462 Jackson Plaza, Ann Arbor, Mich. 48103.

Compact CRT Bows

MAMARONECK, N.Y. — Teleram Communications Corp. has introduced the Model P-1881, a portable CRT terminal.

The P-1881 is a compact device able to fit under an airplane seat. It contains a 7-in. CRT, Ascii keyboard with upper- and lower-case alphanumerics and editing features.

Its 8,000-char. buffer memory can be preserved even when the machine is disconnected from line power.

Price for the basic P-1881 terminal is $3,995, Teleram said from 1032 Mamaroneck Ave., Mamaroneck, N.Y. 10543.

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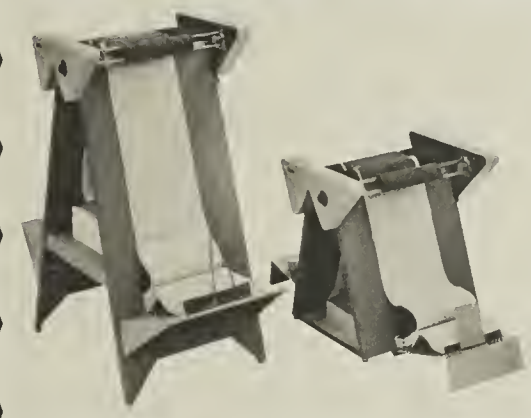

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Modem for Terminet 30

CAMDEN, N.J. — The DE-100 TWX/DDD data set available from RCA allows utilization of the high-speed GE Terminet 30 teleprinter on the TWX network as well as in Bell Dataphone applications.

The unit automatically senses and adjusts printer speed to the incoming call — 30 char./sec for Dataphone, 10 char./sec for TWX — and meets Federal Communications Commission (FCC) certification requirements for direct-access arrangements, RCA said.

The DE-100 data set for a Terminet teleprinter costs $95/mo on a one-year lease, $70 to install and $40 to remove, according to an RCA spokeswoman.

The unit is also available on a purchase basis, she said from Dept. 2610, Bldg. 204-2, Camden, N.J. 08101.

Processor Terminal Runs Alone Or as Remote Peripheral System

HOUSTON, Texas — TEI, Inc. has introduced the Model MCS-PT processor terminal, which can either be a remote peripheral device or a self-contained terminal system with CRT, disk storage, keyboard and a 12-slot motherboard.

Features of the processor terminal include a 15-in. reduced glare monitor, a full upper- and lower-case Ascii keyboard with eight user-defined function keys, and a 16-key numeric pad.

Terminal Transactions

The 12-slot mainframe contains a CPU board that features an Intel Corp. 8080 processor and a special circuit that implements a start-up "jump to" routine to any user-selected byte address, TEI claimed.

The I/O board provides three parallel and three serial ports with selectable transmission rates from 75- to 19,200 bit/sec. Outputs are RS-232C or TTL, according to TEI.

Software provided includes CP/M DOS and Basic on disk. the processor terminal is priced at $3,495; and in kit form it is priced at $2,995, TEI stated. The unit is also available without the disk drive and controller for $2,495 assembled or $2,195 in kit form. The company is at 7231 Fondren Road, Houston, Texas 77036.

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Control Unit For Teletype Cuts 'Junk'

WATERTOWN, Mass. — Digital Laboratories has brought out a "smart" motor control unit that reportedly allows a Teletype Corp. teletypewriter to print and punch paper tape without producing "junk" characters during an of/off cycle.

The Model TR20 is an external motor control with a six-character storage capability that provides a .6-sec delay for the teletypewriters motor to speed up and print, the company said. No programming changes or lead-in characters are required.

A bypass switch has been integrated in the Model TR20 to permit standard keyboard operation. An adjustable timer provides up to a 20-sec turn-off delay.

However, in the event of an unexpected delay between transmitted characters, there will be no data loss, it claimed.

The unit sells for $175 from Digital Laboratories at 600 Pleasant St., Watertown, Mass. 02172.

Hazeltine CRTs Get Price Tags

GREENLAWN, N.Y. — Hazeltine Corp. recently released prices on its models 1510 and 1520 CRT terminals introduced last June at the National Computer Conference.

The 1510 costs $1,395 and the 1520 multiprocessor terminal system costs $1,650.

Hazeltine delayed divulging the prices of the terminals because of a "Guess the Price" contest held at NCC. Thomas W. Cook, senior engineer for Mobil Oil Corp., won the contest.

Productivity Up 15%

Multimedia Data Entry Boosts Output

By Jeffry Beeler
CW Staff

KENILWORTH, N.J. — A service bureau here has boosted its overall productivity by an estimated 15% to 20% in the two years since the firm replaced its keypunch machines with a multimedia data entry system. And for some jobs, the equipment change has increased CMF Key Services' productivity by as much as 100%, according to Fred Beyer, the company's vice-presidnt and cofounder.

This jump in efficiency has raised the data entry service firm's average output of computerized records to 60,000 a day (or about 15 million to 20 million a year) and has boosted its revenues from $780,000 in 1975 to a projected $1.2 million this year.

Beyer partly attributed this higher productivity to the company's decreased use of punch cards. Before it installed the current data entry system, CMF supplied its customers with about 1.5 million punch cards a month at a cost of about $2,000 to $3,000.

He also credits the system with expanding the number of recording media the firm can accommodate in-house. With the keypunch machines it used previously, the company could make in-house data recordings on only one medium. If a customer required input on a medium other than punch cards, CMF had to send the data to an outside contractor for recording.

Expanded Service

Today, the firm can enter data in-house, not just on the traditional punch cards, but also on cartridge disks and 9-track magnetic

(Continued on Page 62)

DP Bureau Establishes 'Secure' Facility

By Lawrence A. Yaggi Jr.
Special to CW

SACRAMENTO, Calif. — "Given the choice, I'd specify a reinforced-concrete, windowless building within a reinforced-concrete windowless building, security systems on both and a secured perimeter with single-access control. I'd design, in other words, a building for computer use," according to Joe Pujals, assistant security oficer at the Stephen P. Teale Consolidated Data Center here.

Pujals recently commented on problems faced by Teale Data Center in securing the second floor of a conventional office building.

Teale Data Center is a state-operated computer service bureau serving 59 other state agencies for normal operational business. The facility occupies 10,000 square feet, of which 3,000 are devoted to storage of 43,000 data reels in the tape library. Total on-line storage capacity is 10.8 billion bytes of data.

Two loosely-coupled IBM 370/168 mainframes are used, operating under ASP SVS. Peripherals include 28 tape drives, 64 double-density disk drives, three 2,000-line/min printers and 31 remote job entry terminals in the field among the center's 59 clients. The installation employs 179 people, most of whom work in the computer room.

Subject to Hazards

Teale is subject to all the hazards peculiar to any major DP facility: stray electromagnetic radiation of some magnitude (e.g., from a welding machine); electronic theft; fire; the need for data privacy; and physical or electronic theft by a "disgruntled employee."

While security is always a concern, it is a more difficult problem if the site selected is a block-sized, multistoried, general office building, as in this case, according to Pujals. The building is conventionally windowed and lobbied, and the existing tenant (Teale's lessor) maintained security with guards (State Police Officers) patroling all entrances, the grounds and the parking lot. In this instance, the lessor also occupied a smaller building across the street.

Coordination Necessary

As a new tenant, Teale Data Center had to coordinate its own security arrangements with those of the lessor for mutual access and total security for both buildings. This had to be done "reasonably," yet with total control of access and identification.

Since security considerations were not part of the original architectural plan, there was no practical way to seal off the second floor, which could be reached from the lobby by both escalators and elevators. Yet the lessor, whose service allows public access to all floors during daylight hours, also maintained a DP facility on the floor Teale would occupy.

When the site was selected, many security needs were recognized. An immediate problem was access to the computer room.

This was met with one mantrap entry-exit booth at the entrance to the computer room. One of-

(Continued on Page 60)

On-Line Microfiche Unit Interfaces to 360, 370 CPUs

NEW YORK — Datagraphix, Inc. has introduced an on-line Autocom microfiche recorder/-processor that interfaces to an IBM 360/25 or larger or to any 370, the firm said here.

The unit connects to the IBM byte multiplexer, block multiplexer or selector channels and can operate up to 150 feet from the CPU, depending upon the host system, a spokeswoman said.

Converts Data

The Autocom unit converts data from the IBM mainframe into 4 in. by 6 in. microfiche, each containing the equivalent of up to 270 pages, she said.

For certain repetitive jobs, no operator intervention is needed. After the recording command is queued in directly from the CPU, the Autocom automatically receives the data and produces the cut, dry microfiche, she added.

The on-line unit utilizes a 16,000-byte buffer memory and offers 42x or 48x reduction, standard or optional full-reversal film processing, up to 12,000 line/min recording speed and an optional 1,600/6,250 bit/in. tape drive for on-line or off-line operations.

The Autocom sells for $61,000 and deliveries will begin in February 1978. The tape drive costs $39,000 and will be available at the same time from the firm at P.O. Box 82449, San Diego, Calif. 92138.

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TS System Helps Students Learn, Recall More

NEWARK, Del. — Classrooms at the University of Delaware here are on-line to a time-sharing system in Arden Hills, Minn., and teachers are using the system to help students learn such diverse subjects as agriculture, biology, home economics, art and music.

The students are enjoying it immensely, according to Dr. Fred Hofstetter, music professor. He noted that with the aid of the time-sharing system his students are increasing their music sensitivities, spending less time completing course requirements and making higher grades.

"Most importantly, many of the students are experiencing the fun of learning for the first time," he said.

It all began two years ago when the university installed one terminal for faculty experimentation. That experiment drew such enthusiastic response that today the university has a network of 32 terminals that deliver educational materials in the form of text, drawings and animated graphics for 24 different academic departments. Nearly 100 faculty members are involved in developing instructional materials for the system.

The system, Control Data Corp.'s Plato, is based upon a CDC Cyber 70 Model 73-28. The dual CPU system has 131K bytes of memory with 2 million words of extended core storage and 12 double-density Model 844 disk drives.

Plato delivers instructional materials in whatever form the author of the lesson designates. Students communicate with the lesson through the terminal's keyboard or by merely touching the screen with a fingertip. Through these two methods of communication, they answer questions, make choices, change the displayed materials or ask for help.

Instructors use the same terminals to develop and update lesson materials and also to check on student performance and time at the terminal, which the system records and processes into whatever reporting format the teacher wants.

Hofstetter, who is director of the university's Plato project, spearheaded the introduction of computer-based education on the campus through the development of several music courses which he then demonstrated to his colleagues. The courses took advantage of the system's speed, animated graphics and touch-sensitive display screen.

He even attached a random-access audio unit and a four-voice synthesizer to the terminal for an ear-training course called Guido. Musical notes displayed on the screen correspond with the sound to help students master the complexities of reading music so they can recognize and correct errors in musical performance.

For drill and practice in music intervals, students merely touch one of the interval names displayed on the Plato CRT screen and it is played by the CPU-controlled synthesizer.

Or, in a reverse exercise, the synthesizer will play a musical interval and the students can identify it by touching its name in the list displayed on the screen. The system immediately flashes a responding message: "That's right," or "Wrong, try again,"

"When drill and practice is done in a self-paced environment such as this, learning is more efficient," Hofstetter said.

"Precious class time formerly devoted to drills can be spent in concept development and more creative aspects said.

Idea Spread

What Hofstetter experienced in computer-based music instruction was soon shared by instructors in agriculture, art, education, home economics, nursing, physical education and even drama, as they implemented Plato in their courses.

In the College of Agriculture, students use Plato for study in plant science, animal science, agriculture engineering and entomology. Courses in genetics and veterinary science use Plato to multiply fruit flies and study animal anatomy. This reduces time-consuming field and laboratory projects, according to Dr. Donald Fieldhouse, professor of agriculture.

For example, in a plant science lesson, students are asked to select the proper chemical treatment for a drooping, ailing plant that is displayed on the screen. If the student selects the proper chemical, the plant immediately straightens into a healthy-looking specimen. If the wrong chemical is prescribed, the plant withers and dies — on the screen. But it can be redisplayed in its former state for another remedial treatment.

Aid to Memory

"This type of instruction is not only entertaining, but students tell me it helps them remember data better than if they read it from a textbook or chart," Fieldhouse said.

In the art department, students are using the graphics and touch capabilties of Plato to study design, type faces and lettering techniques. For example, letters in a particular type style are displayed on the screen for

(Continued on Page 64)

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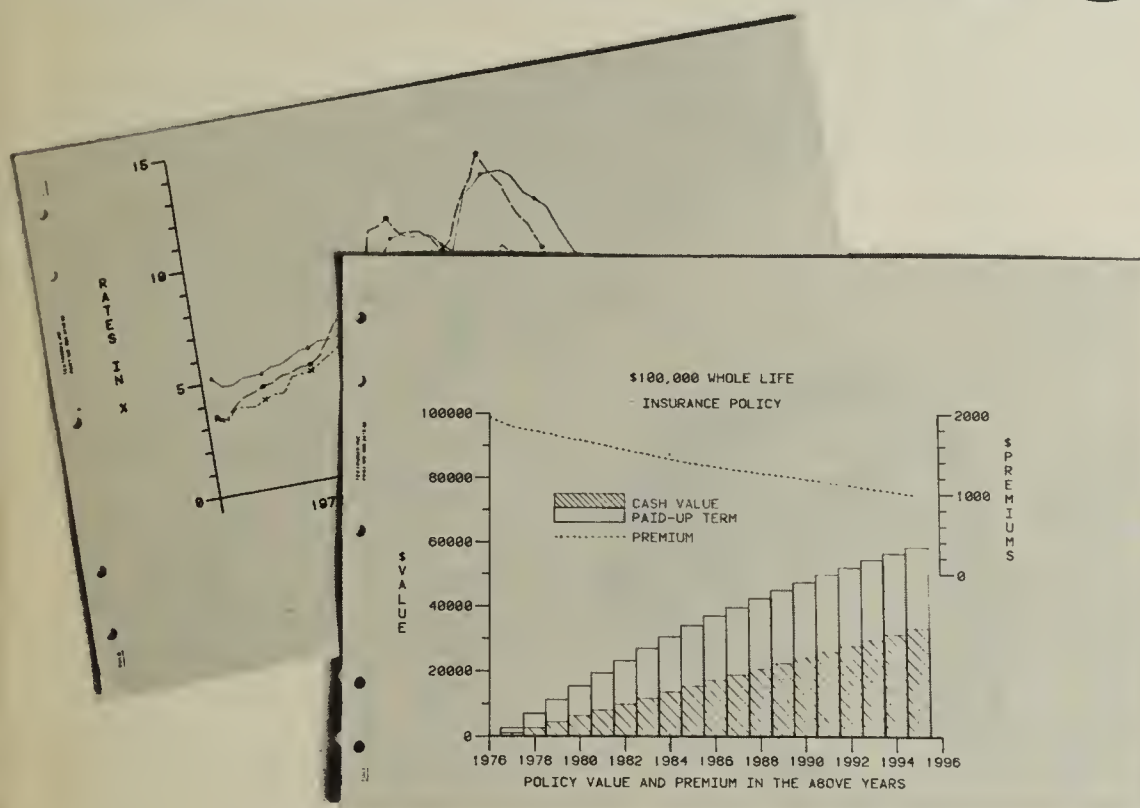

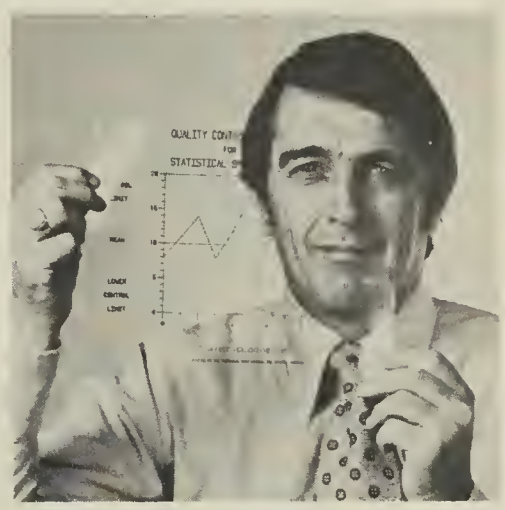

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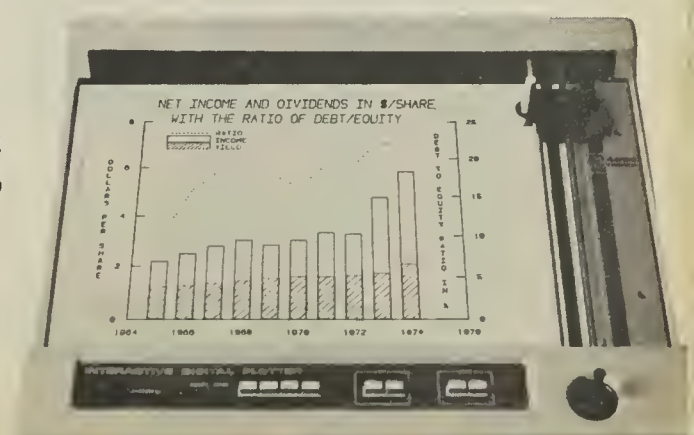

Tektronix
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State DP Service Bureau Creates Secure Facility

(Continued from Page 57)

ficer controlled passage through the booth, which consisted of two locked doors separated by a short passageway.

Simple access control of the computer room entrance sufficed for six months while a number of options were explored among generally accepted systems: key, code, key/code and others.

The key and code systems were rejected for their one obvious flaw: they allow multiple ingress ("tailgating") once the door has been opened by a key carrier. Other systems were rejected as not adaptable to Teale's physical requirements, including the need to coordinate with the lessor's access needs in both buildings on a 24-hour-day basis.

The system chosen and installed offers remote personnel identification and access control, based on a two-zone plan. The computer/data storage area lies within an inner zone, surrounded by a fully secured outer-zone perimeter — a "room within a room" — plus unsecured office space. The inner zone also includes the lessor's computer room, with a separate access point, plus a code-locked door between the two facilities.

The core of the system at Teale Data Center is the control room, located in a protected area within the perimeter, adjacent to the principal computer-room entry-exit point. Heavy glass panels allow visual inspection of the "man-trap" booth leading into the computer room.

Within the control room, which is always locked, one security officer sits at a conrol console that includes three split-screen Videoguard monitor/-control units and 18 additional video monitors. The units are manufactured by Mardix, Inc. of Mountain View, Calif. One split-screen unit controls entry-exit and identification through the outer perimeter; the others control auxiliary entrances into the computer rooms.

Identification control of the man-trap passageway is visual. Two additional split-screen units are used for after-hours control of both building entrances. For emergency use there is a two-way radio and telephone communication link with outside State Police units.

The 18 monitors provide surveillance of the entire perimeter hallway on the "sterile" area principle: Scanning is intended not to obseve personnel movement as such, but to note uncommon items left in the hallways such as briefcases, packages and boxes. Aside from personnel, hallways are requried to be vacant.

Each entry-exit point is an 8 by 8 ft Videoguard booth with two locked, opposed doors and a wall-mounted identification console. Concealed in the console are two CCTV cameras which present full-face and badge views to the split-screen unit in the control room. A third camera in the booth ceiling provides a wide-angle view of the entire booth to ensure occupancy by only one person.

The controller can switch from split-screen face/badge monitoring to full-screen overhead view at his discretion, and may initiate two-way voice communication. Doors can only be unlocked from the control room, and relock automatically on closing.

Cable Transmission

All signal transmission for the electronic surveillance system is by cable which was installed through the building's existing conduits. One cable extends under the street to the access booth at the entrance to the second building.

When Teale went into operation, normal security required one officer per shift at the man-trap entrance to the computer room, plus the outside patrol of building entrances and grounds provided by the lessor. To Teale, this represented a total of five man-years on a 24-hour, seven-day basis.

This system continued through Teale's first six months' tenancy while the remote equipment was selected and installed.

With the Videoguard system one man per shift controls all access to and identification for the building as well as for the computer room. This frees two officers for patrol who would otherwise have to be available to permit entry to the building.

The two officers are then able to complete two additional patrols of the ground and buildings per night. Since both Teale and the lessor share the cost of the system, the net effect has been to reduce the security force by one and double the efficiency of two others, with a net manpower savings of $60,000 per year.

The cost of system hardware and installation amoritzed itself within 18 months, according to Pujals, on savings achieved by using fewer officers. "If we can project a national inflation rate of approximately 5% per year, we'll see even more savings in time," he said.

And there are other, not-so-apparent savings: less casual foot traffic and less need for janitorial service.

According to Pujals, Teale Data Center was the first California State agency to install remote personnnel-identification and access control. Now, two and one-half years later, other state agencies who inspected it have installed 26 remote access units essentially the same as those installed at Teale Data Center.

Yaggi is president of Mardix, Inc.

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Firm Boosts Output With Multimedia System

(Continued from Page 57)
tape (probably the most popular recording medium among CMF's customers), Beyer said. And when the company attaches another communications line to the data entry system in October, CMF will also be able to accommodte IBM-compatible floppy disks for the first time.

This expanded service capabiity has opened previously unavailable markets for CMF and has freed the company from reliance on its sometimes undependable outside contractors, Beyer explained.

CMF began operations six years ago with a small battery of IBM 026 and 029 keypunch machines before upgrading two-and-a-half years later to 35 IBM 129 units. Six months after starting the business, company officials concluded that the IBM equipment, though adequate for the job it had been required to do, had increased their punch-card costs to as much s $2 to $3 per thousand, an unacceptable expense, Beyer recalled.

Company officials also concluded that the IBM machines had unduly tied the firm to punch cards and in so doing, had hampered its competitiveness in the increasingly promising magnetic tape market.

They also complained the keypunch units had limited the company's control over its internal operations. If one of its outside contractors experienced a serious equipment breakdown, for example, CMF could do little to correct the problem except try to explain to an unsympathetic client why the data entry firm would be unable to meet its production deadline.

To alleviate these problems, Beyer and his colleagues decided three years ago to replace their keypunch machines with a more up-to-date and versatile data enty system. In their search, they evaluated equipment from seven hardware vendors, including Inforex, Inc.; Entrex, Inc.; General Computer Systems, Inc.; IBM (which offered a floppy-disk-based system); Lockheed Electronics Co.; Four-Phase Systems, Inc.; and CMC, a Los Angeles-based division of Pertec Computer Corp.

Opted for CMC

CMF eventually opted for the CMC equipment, a Model 5 system with 16 keystations. That configuration in turn gave way two years ago to a more advanced CMC 1800 system that today incorporates 32 Model 108 keystations and leases for $4,600 a month.

Beyer and his associates picked their current data entry system over the other configuration they considered primarily because they were impressed with CMC's service and with the performance of the demonstration models they observed, the company vice-president explained.

Besides the CMC 108 keystations, CMF's data-entry system incorporates a Decision Data Computer Corp. 8010 cardpunch unit, a Centronics Data Computer Corp. 102 printer and a CMC 1116 CRT terminal. Athough the system has no computer, it uses Cobol programs to verify data and RPG-II programs to control inventory, internal billing and invoice preparation.

CMF plans to soon increase the system's array of keystations to 40, Beyer added.

Ampex Expands DEC Memory

EL SEGUNDO, Calif. — Ampex Corp. reports that it has expanded its ARM-10L memory for Digital Equipment Corp. Decsystem 10 KL and KI models to 512K word capacity in a single cabinet.

The 512K-word ARM-10L memory, which is based on 32K by 18-bit modules, is equipped with two- or four-way internal interleaving capabilities. The memory unit requires 7.5 ft of floor space, the firm said.

Earlier the 128K-word and 256K-word versions are field upgradable to the full 512K-word capacity. All three capacities can be equipped with eight ports, in two port increments, a spokesman said.

The system panel provides controls and indicators for power, port priority, port activity status, sector address, sector status, two- or four-way interleave control, address status, data status, parity error status, last module selected, memory hang indicator and hang reset-control, he said.

Typical access time is 500 nsec with a maximum of 520 nsec. Cycle time is typically 750 nsec with a 770 nsec maximum, the spokesman claimed. The 512K-word ARM-10L costs $175,000 and delivery is 30 days from the firm at 200 N. Nash St., El Segundo, Calif. 90245.

Magstripe Verifier Displays ABA Data

TORRANCE, Calif. — American Magnetics Corp. has introduced a magstripe verifier for instant reading of encoded American Bankers Association (ABA) data on magnetic stripe cards.

The verifier has a 38-digit LED display. The user simply passes a magnetic strip card through the reader and the encoded data is displayed on the screen, the company said.

The reader costs $1,495, it added from 2424 Carson St., Torrance, Calif. 90501.

Replaces Key-to-Tape

Dow Increases DP Efficiency With RJE System

ELIZABETHTOWN, Ky. — Dow Corning Corp. has increased its data entry productivity with a 25% reduction in keystrokes and one third less verification time since the installation of a key-to-disk remote job entry (RJE) system.

Dow Corning installed a Data 100 Corp. Keybatch system for the plant here in April 1976, replacing a key-to-tape system for batch data entry of financial and administrative data. The plant manufactures a variety of silicone elastomers and adhesives.

The company wanted both better productivity from its key operators and on-line communications with the host CPU, an IBM 370/158 at the corporate site in Midland, Mich., according to Michael Mallicoat, data center supervisor. With the off-line key-to-tape system, data was transmitted from the plant here to an identical system in Midland where it was manually loaded into the mainframe.

"With our limited operator productivity and mechanical problems tht are normally associated with off-line tape handling, we had a very inefficient operation," Mallicoat said.

In searching for a replacement, the Elizabethtown department evaluated the IBM 3270, which is in use at various other company locations. The study showed that even key-to-tape was more efficient than the 3270 for a number of reasons: The 3270 had no programmable keyboard entry, allowed only sight verification and had no off-line storage. In addition, a benchmark study showed total keying and verifying time was 65% more than tape, and accuracy decreased from 99.6% to 98%.

"Since we were already working at nearly full capacity, it was obvious we could not even maintain, much less increase, our productivity with the 3270," Mallicoat said.

After looking at several other alternatives, the company chose the Data 100 Keybatch system. "It provided state-of-the-art in key-to-disk entry, allowing concurrent off-line storage and on-line communications to the mainframe. The programming interface to the mainframe was minimal. The Keybatch easily emulates the IBM 2780 and 3780, all at comparable cost to the key tape," Mallicoat said.

System Configuration

The current system in the Elizabethtown data center consists of a Keybatch control unit, a synchronous communications adapter, a 215 line/-min printer and controller, a line printer adapter, three local key stations and a 2.5M-byte disk drive.

The major data entry applications include accounts payable, production, usage, inventory, shipments, materials requirements planning, purchase orders, accounting formulations and production planning. Since installation of the Keybatch system with its concurrent data entry/RJE capability, other new applications have been installed, including detailed delinquent analyses, production variances, master file for sample orders and work orders.

New software is being developed for warehouse inventory applications and there are currently about 80 application programs on the master file.

Dow Corning uses the RJE capability to key programs onto disk for transmission to the mainframe. Programs submitted in RJE mode include various routines for retrieval, library maintenance and some program development. The number of batches submitted per day in the data entry function is about 20 to 25, with approximately 10 to 15 in the RJE mode.

"The Keybatch system permits up to 999 programs, which can be used concurrently on-line," Mallicoat said. "The same program can be used by several operators at the same time. Program maintenance for data entry supervisors is much simpler than before."

The Keybatch system provides the operators with a larger, more flexible repertoire of data entry functions. When beginning data entry, the operator enters his operator number into the system for tracking operator statistics. He then selects an option — entry, re-entry, verification, search or audit.

The format number is selected by keying a three-digit master format number available from a master format list. The operator then names the batch of data to be entered via an alphanumeric character field. The first four digits of that character field are used for today's date. This enables printout of all batches with corresponding format numbers at the end of the day for transmission purposes.

Production reports are created on the mainframe overnight and sent back to the Keybatch terminal, which is set up in an auto-answer mode and 3780 emulation. The number of output reports has increased to about 35 reports per day, about double the previous output, according to Mallicoat.

The Keybatch system contains many features which have simplified and streamlined the data entry operation. Among these are table look-up, check digit verification and arithmetic computation. A compare and branch feature allows branching forward and

(Continued on Page 64)

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COMMUNICATIONS AND INFORMATION HANDLING

TS System Helps College Students Learn More

(Continued from Page 58)
students to experiment in spacing them.

By merely pressing a directive key, a student can make the space between two letters become narrower or wider. This eliminates the need to hand draw letters and then carefully arrange them to study the effects of spacing.

Another computer-based art lesson allows students to produce on the Plato terminal screen their own designs and then rotate them to any desired degree for observation. One of the major advantages of computer-based design is that students can easily redo a portion of the unit at any stage.

According to one student: "I spent more time redoing what I'd already done just to insert one change. Now I can include new ideas in a few seconds."

Other principles of design — such as form, line, light, movement, balance and rhythm — are also rapidly available for display on the Plato screen. Students experiment with these elements by adding their own concepts through the keyboard or by touching the materials they want to change or move.

In the home economics department, students are trading the traditional dressmaker form for a computer terminal to determine proper fit of the garments they make in textiles and clothing classes. They are enthused about the new fitting technique as well as about a lesson on how to analyze and correct fitting problems, according to Frances W. Mayhew, a department professor.

"A certain amount of dressmaking for the beginner was trial and error with lots of disappointments and wasted materials," Mayhew said. "Now students are able to simulate design and construction plans on the terminal and they see the results before they cut into material."

As a result of its success with Plato, the home economics department is organizing a national consortium for the development, evaluation and distribution of computer-based home economics lesson materials.

"By sharing efforts and expertise, home economics instructors will be able to expand computer-based instruction into other areas of the curriculum and generally enrich course offerings," Mayhew said.

Highly Organized Support

Central to the university's rapid implementation of computer-based education is a highly organized support and resource program. This was created when just one terminal was installed and consisted of a coordinating committee composed of 17 teachers. Within three months the number of faculty involved had grown to 55, and now more than 100 are engaged in course development.

Each academic area involved with Plato is assigned a programming specialist who helps the faculty members develop courses.

"Our experience with Plato shows it is capable of sustaining the motivation of faculty members. They did not receive released time or incentives of any kind other than the improvement of instruction at the University of Delaware," Hofstetter noted.

Hofstetter believes computer-based education is the next revolution in education and predicted that within 10 years there will be broad-based implementation of it in universities."

"It is inevitable," he said. "There is no stopping it and really no reason to do so."

Chemical Firm Uses RJE To Increase Productivity

(Continued from Page 63)
backward within a format automatically.

The output reformatting feature allows the operator to arrange a format in the order the data appears on the input document without regard to how the computer will handle it. The system automatically rearranges the data into a computer-usable format before transmission.

This, Mallicoat said, is a time-saving feature for the operator. Accumulators enable saving data that has been entered for later reinsertion into a record, thus eliminating operator rekeying.

Activity Log

The activity log feature enables the system to keep track of each supervisory transaction on all batches. If a question arises concerning whether or not a batch has been transmitted, it is a simple matter to check the log.

Accuracy has been improved through features like range checks, which ensure data validity. Data entered must agree with preselected values and range tables or the system will reject the data.

The operator can now selectively verify fields within a record and edit and check the data at the same time it is entered. Previously, it was impossible to verify all records on a key tape in an eight-hour working day, without overtime.

Reduced Keystrokes

The net result has been a significant reduction in keystrokes and verification. Production has increased without the need to add data center personnel. Operator performance is now monitored through the Keybatch statistics feature which keeps track of keystrokes and verification errors.

Reliability, Mallicoat said, has improved considerably over that of the key-to-tape system. As far as vendor support goes, "We get excellent response. The service personnel are really top-notch," he said.

Dow Corning will soon be installing the Keybatch software Version 3.1, which will enable sending data from the communications line directly to disk, he said. It will also implement a feature called Index Sequential Table Retrieval (ISTR) to speed up response time during table lookups.

The current Keybatch system provides an excellent foundation for expanding into distributed processing with some local processing capability, he concluded.

Recorder Notes Line Noises

ESCONDIDO, Calif.— Micro Instrument Co. has announced a digital power line transient disturbance recorder and analyzer.

The Model 5229 portable sag/surge recorder prints out on an integrated alphanumeric printer all power line disturbances over the entire DC current range, according to the firm.

The instrument is said to operate on-line 100% of the time and will miss no electrical disturbances, giving priority to higher-amplitude transients, regardless of when they occur.

It costs $3,495, a company spokesman noted from 2250 Micro Place, Escondido, Calif. 92025.

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Publisher Benchmarks Minis for DDP

By Esther Surden
CW Staff

BOSTON — Houghton Mifflin Publishing Co. just completed an in-depth analysis and benchmarking of three minicomputer systems for a distributed data processing (DDP) application.

The system finally chosen outperformed its nearest competitor by nearly a two-to-one margin, according to Jim Burns, corporate director of data services.

The publishing company decided to go the distributed processing route as part of an overhaul of DP activities, Burns explained. Right now the six locations involved have a "mixed bag" of DP capabilities, with three of the branches using key-to-tape equipment and two others using Honeywell Information Systems equipment. The central DP department in Burlington, Mass., has a host IBM 370/148 mainframe.

"The easiest approach that we could see was to take and bite off pieces" of the system, Burns noted. "We decided to go out into the field and update the general user community," bringing them up to an automated state so they can dispense with manual procedures. Streamlining operations in the user locations will hopefully give the end users a competitive edge in the industry, Burns added.

Finding systems capable of performing a distributed processing application was no easy task, Burns noted. "We went to a number of different sources" to determine who had the machines that could do the job. "We came up with 11 potentials," among which was the IBM 3790.

The company sent out its specifications to the 11 prospective manufacturers and they "came back and told us what they could do and could not do." After a technical evaluation of the respondees the DP department the field down to three finalists, according to Burns.

"We told the other eight that we would concentrate our attention on the three that we felt could do the job," he said. Those who fell out were rejected because of limited storage capacities, unavailability of software to support the firm's processing needs or other problems, he added.

The three finalists were Digital Equipment Corp. with its PDP-11/70, Hewlett-Packard Co. with the 300 II and Computer Automation, Inc. with its Syfa system.

(Continued on Page 71)

More Survey Results Show

Users Satisfied With Maintenance

By Esther Surden
CW Staff

NEWTON, Mass. — Minicomputer users responding to a recent CW survey called hardware maintenance of their systems either "good" or "excellent" in a vast majority of cases.

Only 23 of the over 220 users responding to the survey rated their maintenance as poor [CW, Aug. 29].

Those who said hardware maintenance was good, however, did give suggestions as to how it could be improved. As one user said, although "response time is good, the service representatives are not always competent."

Another user noted that the service department his vendor offered was not large enough, while yet another said "although there is rapid response time," he has trouble getting parts.

One Hewlett-Packard user in the U.S. government said the vendor "can usually diagnose and supply a positive fix on the hardware," but "vendor's customer engineers are hardware-oriented, not backed by software support personnel."

Some of Digital Equipment Corp.'s technicians are "rotten" and some are "excellent," another user at a medical center noted, pointing out the problem of spotty hardware maintenance.

'Adequate Talent'

A Burroughs Corp. B1716 user rated his vendor's hardware maintenance as good and said that Burroughs has "adequate talent that sometimes lacks depth and quick response." Another Burroughs user, of a B1705, also called hardware maintenance "good" but said "there was only one customer engineer for too large an area."

"Quality of the repairmen" was "uneven," another user of nine minis from DEC, Interdata, HP and Data General Corp. said, while another user of Burroughs and HP equipment called his service excellent "with average response time two hours and downtime from 2% to 5%."

A user of a Texas Instruments, Inc. TI 960 minicomputer rated TI's maintenance as "fast and effective . . . the thing gets fixed." A very satisifed Microdata Corp. Reality user called the vendor's hardware maintenance excellent "because of remote diagnostic capabilities" and pointed out that the "system's expandability is almost infinite."

A DG Eclipse and Nova "have given us excellent service for a minimum investment," a municipal DP manager commented. However, the parts inventory kept by the vendor was "insufficient," this user stated.

'Excellent' Rating

Rating the maintenance of an IBM 3/12 as "excellent," one user indicated the vendor features "excellent response, turnaround" and "downtime is almost zero."

In another case, a life insurance company that uses DEC equipment said DEC's hardware service was "poor" because of "slow response.

"They sent too many trainees" and were "low on parts."

A DG840 user at a junior college said his vendor's "engineers are prompt in arrival and their

(Continued on Page 71)

Datapro: User Beware In Buying Small System

DELRAN, N.J. — "The watchword in selecting a small business computer is 'buyer beware,'" Datapro Research Corp. warned readers of its most recent "All About Small Business Computers" report.

"All too often the buyers of this class of equipment have little or no understanding of DP principles and are likely to buy the wares of the salesman who arrives first or sells hardest," the report continued.

"No company should *ever* buy a computer from the first salesman who comes through the door. It's always wiser to check out the offerings of at least a few of the other major suppliers, and you shouldn't hesitate to play one vendor against the other in an effort to get the most for your money," Datapro advised first-time users.

Promises of extra software, technical support and other concessions should be specifically included in the final contract, the report added.

Before considering any system, users should demand detailed specifications for hardware and software from the vendor. A full-scale demonstration of one of the user's principal applications is also helpful, although a demonstration program "whose functions are similar enough to your own needs so that you can draw realistic conclusions about the system's processing speed and ease of programing or operation" will do, the report stated.

The 62-page report features 50 pages of comparison charts covering specification of 249 current systems from 87 vendors. Also included is a chart that summarizes the experience of about 750 respondents with a total of nearly 1,800 minis and small business systems.

The report costs $12 per copy from the company at 1805 Underwood Blvd., Delran, N.J. 08075.

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Magazine Distributors Get System

BALA CYNWYD, Pa. — An in-house DP system designed to meet the needs of magazine, book and newspaper distributors is available from Sonco, Inc.

The system handles allotments, receiving, distribution, invoicing, returns, statements, bulk records and sales analyses, a spokesman noted.

Called MDS, the system guides the operator through all job steps by continuous prompting and provides for verification of input data and error correction.

The hardware configurations supplied by Sonco consist of Digital Equipment Corp. components. All MDS applications software is written in Dibol and runs under the DEC CTS-300 operating system. Hardware maintenance is available to MDS users from DEC, the company reported.

The basic MDS hardware configuration available from Sonco includes a DEC PDP-11, a two-drive disk subsystem with 7.5M bytes of storage, a Decscope keyboard-CRT display unit and a 180 char./sec printer. Special interfaces to Universal Product Code (UPC) scanners are available, as are 300, 600, 900 and 1,200 line/min printers.

Purchase price for a basic MDS hardware-software system is $54,00. It may also be leased for $1,600 per month, including maintenance, under a five-year term agreement. Delivery is 45 days after-receipt of the order, a spokesman noted from Sonco, Inc. at 211 Rock Hill Road, Bala Cynwyd, Pa. 19004.

Sonco MDS System

DeAnza Has Digitizer

SANTA CLARA, Calif. — DeAnza Systems, Inc. has unveiled a video camera digitizer and image storage system that will digitize an RS-170 or RS-343 signal and store it in digital refresh memory for computer analysis and enhancement.

The Model CD5506 can hold an image in a 64-level gray scale with 512 by 512 pixel resolution in one TV frame, according to the firm.

The digitizing system is said to be suited for use with microscopic images, photo analysis and telescopic images. The device will digitize the captured image to 256 gray levels, DeAnza added.

The system is designed to interface to a Digital Equipment Corp. PDP-11 Unibus, although other "popular" minicomputer interfaces are optionally available, the company stated.

Prices for the CD5506 digitizer, not incuding the camera or CRT monitor, start at $15,300, according to DeAnza at 3444 De La Cruz Blvd., Santa Clara, Calif. 95050.

TP-50 Lab System Based on LSI-11

OAK RIDGE, Tenn. — The TP-50 from Tennecomp Systems, Inc. is a laboratory system based on the Digital Equipment Corp. LSI-11.

Designed for use in pulse height analysis, instrument control and general computation, the system has a large display, keyboard and numeric keypad as well as a minifloppy disk drive. A 40-column impact printer is optional.

Users can add any standard LSI-11 or PDP-11-compatible peripherals, the firm claimed.

The unit costs $15,400 for the base configuration from the company at 785 Oak Ridge Tpke., Oak Ridge, Tenn. 37830.

Why do we sign our name with these words?

Gemini Has Turnkey

TONAWANDA, N.Y. — A turnkey minicomputer designed specifically for medium-sized businesses' on-line operations is available from Gemini Data Systems, Inc.

The system is based on Data General Corp. hardware and Automated Quill, Inc. software, a spokesman noted. The standard software incudes a business application utility subroutine library, open-item accounts receivable, inventory control, billing, open-item accounts payable, financial reporting and payroll.

Basic hardware for the system includes a 32K-word Nova, one CRT, 10 million bytes of disk and a matrix printer.

The basic configuration costs $38,250 from the company at 2638 Sheridan Drive, Dept. 378, Tonawanda, N.Y. 14150.

Mini Suits Business, Science

PROVO, Utah — Billings Computer Corp. is offering users a business and scientific minicomputer called the Data-Byte System 1.

The basic system includes a Billings CPU, dual floppy disks, a B-100 terminal and a bidirectional line printer. Operating software and relocatable Fortran IV are included as a standard part of the system, a spokesman said.

Hardware options available for the system include higher speed printers, X-Y plotters, analog-to-digital and digital-to-analog converters, acoustic couplers and application software as well as 50M- to 300M-byte hard disks.

The basic system costs less than $18,000, the spokesman added from Billings Computer Corp., P.O. Box 555, 2000 E. Billings Ave., Provo, Utah 84601.

PDP-11 Board Bows

SANTA ANA, Calif. — Able Computer Technology (ACT) is offering its QuadrAsync/C interface board to Digital Equipment Corp. PDP-11 users.

The unit gives users four asynchronous communications channels but presents only one load to the system's Unibus, a spokesman stated. Called a 20ma current loop alternative to the DL-11C, the unit is software compatible with the DEC PDP-11, according to ACT.

Contained on one quad board with four DEC-compatible connectors, the unit operates in full- or half-duplex mode.

The unit costs $1,600 with quantity discounts available from the firm at 1616 S. Lyon St., Santa Ana, Calif. 92705.

Interdata Users Get Array Device

NEWTON, Mass. — Computer Design and Applications, Inc. has an array signal processor designed for use in Interdata 8/32 and 7/32 minicomputers.

Occupying a single plug-in board, the system is designed for such applications as image enhancement, voice processing and analysis of seismic data, a spokesman said.

The board derives its power from the host computer, the company noted, and is said to be able to perform array calculations from 10 to 50 times faster than minicomputers used for that purpose.

The unit costs $19,500 with quantity discounts available, a spokesman said from 375 Eliot St., Newton, Mass. 02164.

Drafting System For Wang Units

SAN ANTONIO, Texas — The EDP-11/75 flatbed drafting system can now be interfaced to Wang Laboratories 2200 minicomputers, according to the vendor, H. Dell Foster Co.

The microprocessor-controlled stand-alone system offers users a resolution of .001 inch, the firm noted, and is tiltable to 55 degrees. It features a three-position universal drafting head.

The plotter, plotter interface and software driver to convert existing Wang applications programs cost $18,700 without a vacuum hold-down feature and $19,950 for a version with vacuum hold-down. The Wang 2200 interface must be added for $450, a spokesman said from the company at 14703 Jones Maltsberger Road, P.O. Box 32581, San Antonio, Texas 78216.

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Products that offer the user up to four functions in one system. Remote job entry. Key-to-disk data entry. On-line file management. And stand-alone processing. All configured to meet application requirements.

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To protect the user's time and resource investment in system procedures and software, by providing continuity between every product in the Data 100 line.

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Data 100 products are designed for multiple tasks.

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Multifunction data processing systems can do four jobs, at nowhere near the cost of four systems.

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This package is named Video Programming Tools (VIP). VIP offers a broad array of TSO commands and sub-commands providing a generalized on-line update and inquiry system for its user. An associated data dictionary facility is provided to allow users to define specific field definitions for files being accessed. Fixed or variable length records are handled for ISAM, BDAM and sequential datasets. Data, at your option, may be displayed in hex, bit, packed or character format. Multiple formats may be assigned to one field. VIP is also very handy for creating complicated test files for program debugging.

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- Customized SYSGEN
- Notifys you when tapes need cleaning
- No operating system "Hooks "
- No extra tape label data

The system runs on an IBM 370 computer under VS2 with TSO and SMF. You may use LIBMAN under a perpetual lease or monthly rental plan.

Conversion Packages

RPG/RPG II To COBOL Translator

This package accepts all types of RPG and produces ANS COBOL. The resulting COBOL program is modular in design (main driver perform sub-routine) and follows the basic RPG process cycle: Read, Process, Write. RPG data and procedure names are used without exception unless they are COBOL received words. Several client service options are available: Perpetual Lease, Conversion only, Clean Compile and full implementation including production JCL, test and installation.

MAP To COBOL Translator

Honeywell MAP source code is the input and IBM ANS COBOL is the output. Originally, MAP was programming language for the earlier General Electric 400 Series Computers now referred to as Honeywell 400 Series Computers. The Translator runs under IBM's OS/VS operating systems and will work on either 360 or 370 hardware. The resulting COBOL procedure division uses section-level code to accommodate the translation of MAP internal sorts having I/O procedures. A common print routine is inserted into each report writing program to convert MAP carriage controls to those supported by IBM. Various warning messages are provided as part of the translator output to highlight potential problem areas within the translated program.

COBOL To COBOL

System—3 COBOL is the input and 360/370 OS ANS COBOL is the output. This package is designed to save your programmers the boredom of changing 5000 select and FD statements the same way every day until your conversion project is done. Also specific differences such as COMP—4 (Binary), missing value clauses, UPSI switches, etc. are handled. Since the System—3 used no printer carriage control character in front of the print line all print commands are replaced with a perform of a common print sub-routine which inserts the correct carriage control for 360/370 printing.

Utility Software

SIMBA

SIMBA is a blocker/deblocker interface between your applications programs and relative block BDAM datasets. By allowing you to handle relative block BDAM as though it were relative record BDAM you save a considerable amount of disk space for dataset allocation as well as realize an improved program processing efficiency. SIMBA is very valuable when converting from hardware environments where relative record accessing was heavily used to an IBM 360/370 enivronment where BDAM is not oriented toward blocked records. SIMBA will run on any OS/VS IBM 360/370 hardware.

DASDCMP

This is a Generalized File Utility designed to expedite programmer productivity during major conversion projects, parallel testing or regression testing where large data files must be compared to verify new program accuracy. The compare and print function, when a difference is sensed between two files, prints the file one record followed by just the differences for the file two record. Errors are quickly spotted. Control card parameters are accepted so you can compare specific parts of a record or ignore specific differences. Also file merging, match compare and print and print only functions are available. Records are printed in alpha and hex.

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Boeing Division Installing Mini-Based Control System

By Robert C. Gamrath
And Fred M. Stewart
Special to CW

SEATTLE — While the Fabrication Division of Boeing Commercial Airplane Co. here can do little about an environment indigenous to a machine shop, it is removing from the floor two major causes of downtime — tape readers and spoolers — and replacing them with a minicomputer-based on-line distributed numerical control system. By the end of 1979, 80 machine tools are planned to be assimilated into the system.

Presently, our Distributed Numerical Control (DNC) process, developed by Allen-Bradley Co. of Cleveland, Ohio, is operating 25 tools.

Its base is comprised of two Allen-Bradley Bulletin 1795 systems, each incorporating an Interdata 7/32 minicomputer that transmits instructions from a remote location directly to the machine tools. Enclosed in a room above the machine shop floor, the minis are removed from the severe elements and are therefore unaffected by the environment below.

Though our system is still many months away from full implementation, its present phase is far and away superior to past methods. Like most machine shops with numerical control tools, we had — and still have in many instances — photo electric tape readers and electromechanical spoolers on the floor.

Mylar tapes to control the tools were brought to the floor where they were run through readers.

Programs were read in blocks, the tapes starting and stopping after every one to two inches. Thus, in a 500-foot reel of tape operating at 400 char./sec, the reader started and stopped 12,000 times.

Besides such heavy-duty operation, the readers and spoolers were exposed to hydraulic and lubricating oil, coolant, metal chips and a mist that hangs over the shop. All of this contributed to numerous failures and an ongoing program of maintenance.

As conceived in diagram form, our system will resemble a pyramid with part programming computers at the apex servicing two modules that will operate a total of 80 machine tools.

A module consists of two systems. Each Bulletin 1795 is designed to operate 20 machine tools. It may be linked to machine control units, which in turn operate the machine, or machine terminal units connected to machine control units.

When the system is complete, our parts program will rest in a data base library, also resembling a pyramid. At the apex will be an "active" library of stored parts programs, which can be accessed for transmission to a tool-operating terminal.

The "ready" library in the middle is for parts programs scheduled for near-term use, but not currently in demand by a terminal. Speed is less important but still must provide for suitable response.

The "archives" are exactly that — every parts program in our library.

When the system is totally operational, the manufacturing engineering group responsible for developing parts programs would store the data in the archives. The parts programmers will have sole responsibility for management information in the archives.

Programmers will be able to revise the status of programs or purge them from the archives. Using a CRT, a programmer will be able to track a parts program to a particular library level and put an immediate hold on it for change or purge. If the program is already in the "active" stage, we will allow the part to be cut before recalling it.

Gamrath is Director of Facilities and Stewart is manager of Mechanical Equipment Engineering at the Fabrication Division of Boeing Commercial Airplane Co., Seattle, Wash.

Operator mounts punched tape onto system at Boeing Commercial Airplane Co.'s Fabrication Division.

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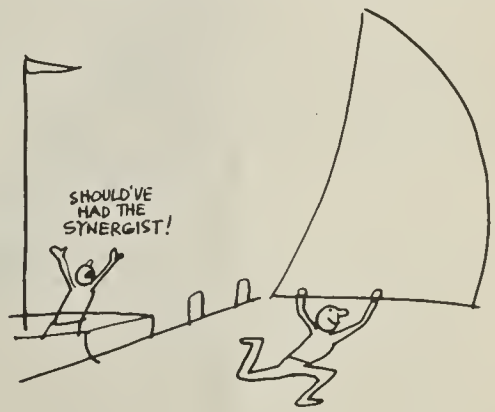

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Schedules Closed Faster

Auto Metal Fabricator Keeps Growth Rolling

AKRON, Ohio — A metal fabricator for the auto industry is keeping its business rolling with the installation of a small business system.

In order to meet production schedules, Falls Stamping and Welding Co. must stock huge inventories of steel and other raw materials. Combined with a weekly payroll of over 150 employees, inventory control became an extremely complicated job.

Records had previously been kept by hand, but the complexity of Falls Stamping's payroll dictated the need for an automated system.

Initially, Falls Stamping contracted with a local service bureau for computer assistance. It didn't work, according to D.A. Stoneman, controller. It took up to four working days for information from the center to reach the company, he said.

The relationship became even more difficult during severe weather conditions. The service bureau failed several times to deliver payroll checks on time and union officials were understandably concerned, he noted.

After switching to a different service bureau, the situation improved. But a similar problem soon developed, forcing the company to prepare payroll checks by hand to avoid a union confrontation, Stoneman said. On one occasion it took two employees one full day to prepare and distribute checks, he added.

"Service bureaus," according to Stoneman, "were charging us $1,800 per month for hourly payroll which was approximately 80% of their work for us. The other 20% was for miscellaneous reports." When it came to nonprogrammed requests, it meant an additional delay due to programming time.

"What we wanted to do," Stoneman said, "was to get away from the problems with service bureaus and have our own small business computer system."

Narrow the Field

After reviewing and evaluating findings in a Datapro computer research report together with competitive product literature, the field was narrowed to 12 computer manufacturers. A letter was sent to each manufacturer requesting a quote on a 16K system, 6M bytes of disk with a printer and CRT.

"We developed our own questionnaire," Stoneman said, "which was sent to each finalist. Based on responses and personal interviews, the Microdata Corp. Reality system was eventually selected."

The company needed a system that was easy to operate. "All the way from the secretaries to the company president, we needed a computer anyone could communicate with," he said.

The system installed has 16K bytes of memory, 10M bytes of disk, two CRTs and a printer.

Almost immediately after the system was in operation, Falls Stamping began to realize a return on its investment, Stoneman said. The monthly cost for owning the system was about half what the service bureaus had been charging, he added.

One of the most important features was the programmability and retrieval of information in Microdata's English. "It was hard to comprehend how fantastic English really was. Now that we have it, it's remarkable. What a powerful tool it has turned out to be," Stoneman said.

The system handles scheduling, weekly payroll and inventory. It inputs daily invoices and updates receivables simultaneously. Payroll now goes out on schedule without concern over violating union contracts. "There are many other areas where the system can help improve our operations," Stoneman said, "that we never thought of before."

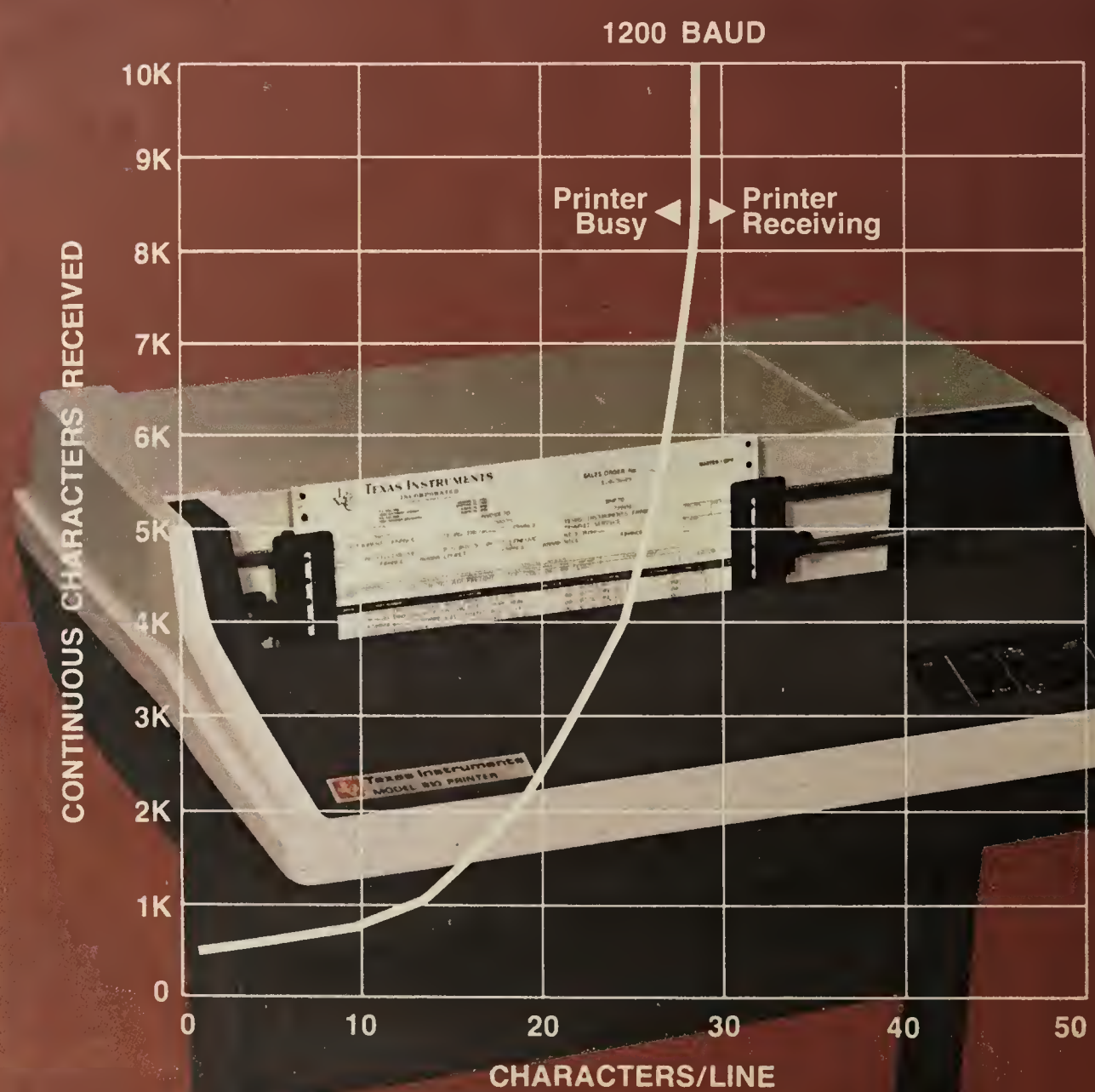
Alternate Jobs

A typical example of how the system has enabled Falls Stamping to react quickly to changing situations was when

(Continued on Page 71)

New from TI.

Plot the performance of the Model 810 Printer against any other printer on the market.



With average line lengths of more than 28 characters, the 810 Printer can accept continuous data at 1200 bits/sec. with no "printer busy" interruptions for carriage return.

Auto Metal Fabricator Keeps Growth Rolling

(Continued from Page 70)

a major auto manufacturer suddenly shut down six plants. The computer immediately provided alternate routings for materials, personnel and press loads. It listed run times for alternate jobs and noted orders that could be scheduled in place of the jobs that were being held. It even told Falls Stamping if sufficient materials were on hand to complete alternate jobs. If not, it notified purchasing to make the buy.

What has the addition of the computer meant to Falls Stamping? Profit, according to Stoneman. Schedules are closed as much as five days faster every month. Jobcosting is more precise than ever before and available in a number of formats. Response to customer demands is faster and more accurate, he said.

On the management side, department heads can have a status report on any job or materials-on-hand by pressing a few buttons on the terminal. Management response time to any problem area is shortened by three days or more, he stated.

"We've more than paid for the system already in increased efficiency," Stoneman said, "and we expect it to have a major positive impact on our profits from now on."

As far as planning and projecting, the mini permits Falls Stamping to plan for the future as well as the present. Cash flow has been improved tremendously through production efficiency, making it possible for meaningful financial planning for the future, he said.

Publisher Plans DDP

(Continued from Page 65)

A test bed of 8,700 typical transactions was created for the benchmark testing, Burns explained. "The transactions would be different going into a CRT against the current method, so we really had to create" the data base, he added.

Among the formalized tests were multi-keyed access; generic search — partial key retrieval; significant word access; and multitasking capabilities. Also included were record updating via key; high-volume throughput and high-speed access to disk; and random, sequential and indexed access on the same file.

The department ran the 8,700 transactions through multiple CRTs and timed the first and last terminals to complete the transactions. "The last CRT to finish up all 8,700 transactions" did so in slightly less than three and a half hours — the Syfa system. The average time was about two and a half hours, he said.

HP was the next closest competitor, with the last CRT run finishing in under six and a half hours and the average CRT time in about five hours.

In DEC's case, "its last CRT didn't wrap up for almost nine and a half hours" and its average time was about six and a half hours.

Although price comparisons of the three systems "didn't carry an enormous amount of weight," the Syfa system was about $100,000 cheaper than the nearest competitor.

The first Syfa system is already installed in the firm's DP department for system development. The largest branch, in Geneva, Ill., will get its mini in April.

Upkeep OK: User Survey

(Continued from Page 65)

repairs."

A user of 34 NCR minicomputers said the maintenance service he received from the manufacturer was excellent, but another NCR user, of a single Century 101 system said the vendor's maintenance was poor "because customer engineer knowledge was lacking."

'One-Day Response'

"One-day response with a maintenance contract and excellent repair parts availability locally" rated HP an excellent mark from a user in Maryland. "Very little downtime; 99% up' said a Four-Phase Systems, Inc. user, rating the system "excellent."

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Mini Speeds Flight Data to Airline Passengers

LOS ANGELES — The nearly 750,000 passengers who pass through the Hughes Airwest Terminal at Los Angeles International Airport each year receive updated information about aircraft arrivals and departures from displays controlled by a minicomputer.

Similar systems are also operating at Hughes Terminals in Las Vegas, San Francisco, Phoenix and Salt Lake City.

The mini is the heart of a new airline Intelligent Flight Information Display system designed and developed by the Systems-West Division of Conrac Corp., Duarte, Calif.

Under the control of a Computer Automation (CA) Naked Mini, the system provides information on arrivals, departures, gates and planes as well as new flights or cancellations. It handles as many as 16 flights simultaneously and displays information on 23-inch television monitors located throughout the terminal.

"Under the old system, information was disseminated by telephone from the operations office to check-in counters and boarding gate personnel, who in turn would update manual flight boards," according to Bud Donohoe, director of ground communications and reservation systems for Hughes Airwest in San Francisco.

"In many instances, though, phone calls weren't made or employees were away from their phone and didn't receive the information," Donohoe noted.

At other times, especially on busy days, changes would come so thick and fast passenger agents had no time to update the boards. "When this happened, the agents would be continually interrupted by questions by passengers," he said.

Flights Updated

Now operations agents update flight information using the computer terminal, which is then used to transmit the data to the display monitors.

"It eliminates the time needed to make phone calls and change manual flight boards and reduces the time employes are distracted from their other duties," Donohoe said.

The system also enables Hughes Aircraft to keep employees up to date on continually changing operations information. "Several internal channels are used to disseminate operations data such as aircraft number, gate assignment, fuel load, passenger transfer and cargo data. This information is displayed on 9-inch monitors located below ticket counters and boarding gate areas, in maintenance areas, in hangars and in management offices," according to Ralph Sellars, station manager for Hughes Airwest in Los Angeles.

In operation since July, the system links large television displays in public arrival and departure areas and 9-inch internal monitors in operations areas with the Naked Mini.

The flight schedule for an entire week is stored in the minicomputer's memory in chronological order of flight activity — along with gates, times and other remarks. Each flight is coded for the days of the week it is scheduled.

Daily Setup

When setting up for the day's operation, the operations agent presses a button on his control-edit terminal and the day's first 16 flights appear on the control monitor screen. If no temporary changes are required, the agent punches another button that causes the minicomputer to separate the arrivals from departures and transmit them to the appropriate public display screens.

"All of the television monitors are activated by signals received from the Naked Mini. The operations agent depresses a button labeled 'roll-up' and the top line of the display rolls off. All other lines roll up and the next flight is pulled from the minicomputer's memory and appears on the screen at the bottom of the line. The agent then depresses the transmit key and 'execute' button and data is transmitted to all public display screens," Donohoe said.

"From data in its memory, the mini even knows when to automatically omit flights that do not operate on particular days," he added. "For example, if a flight departs only on Tuesday and Thursday, the computer brings it up to the screen on these days and no others.

"The entire updating operation takes approximately seven seconds," he noted.

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Money-Saving Packages Gaining Acceptance

By T. Schindler
Special to CW

NEW YORK — Packaged applications software makes good business sense for small businesses because it can save money, it can save a great deal of executive time and it offers the user the possibility of knowing exactly what is being provided.

A custom system design may or may not be complete and may not become reality as specified, so users should have a close look before succumbing to the "not invented here" syndrome.

The rise in acceptance of packaged applications software by the smaller user has resulted from a variety of phenomena.

Hardware price/performance in small systems has advanced rapidly, making the benefits of on-site computer mechanization available to smaller and smaller businesses and other enterprises.

The service bureau, either time-sharing or traditional, of necessity burdened with substantial skilled personnel overhead, has not been able to pass on hardware economies because of an off-setting rise in other costs. The economics of in-house processing have thus improved. Service bureaus like the laundromat and freezer center to the home owner, are less essential since many traditional users can now afford their own systems.

Complexity

At the same time, business complexity, largely due to increasing governmental reporting requirements, has virtually forced mechanization of data gathering and reporting procedures for many businesses.

Improved communication and DP education within the business world, even at very low levels, has made increasingly clear that the end result of an accounting system is virtually the same for every business. Procedures differ, of course, but the emotion attached to "my way" is disappearing, partly because of the need for economies and partly because of rising mobility, which is making the long-term employee cadre less common.

Programming costs were always a major consideration, however, they were a relatively obscure, difficult-to-identify segment of the overall mechanization program. Today, the compounded situation of declining need for in-house technical expertise and the rising direct and indirect costs of systems professionals has cleared the way for much compromise by users.

It is fine to be "different" and require a custom designed and programmed system, but how much is it worth? Is it worth $7,000 to $8,000 per man-year? Perhaps. What about $20,000 to $30,000 per man-year? Perhaps not. At least alternatives are worth considering carefully.

'Used' Packages

Combined hardware/software vendors are also interested in reducing the number of developmental software personnel on board by offering once-developed packages installed by less expensive (and easier to find) field programmers.

As usual, economics, communications, education, technology and government are leading the way toward defined peformance standards. Standards are growing out of common basic requirements and benefitting from the input of users, vendors and consulting professionals.

Experience is undoubtedly improving in terms of general package systems performance as well as user satisfaction.

Early development attempts were, predictably, limited by the exposure of the developer whose know-how tended to be single-sourced and thus not necessarily broadly usable. Also, in-house staff of early user organizations tended toward strong "not invented here" attitudes and, while not necessarily openly hostile toward packages, often did less than the maximum in trying to make the package work.

The idea, however, of packaged applications software was and is both logical and economically smart. Vendors continued to try and improve upon past efforts with some startling results.

Today, the mere thought of specially designing and programming a general accounting system is absurd.

Furthermore, advances in design and programming methods allow for system flexibility permitting, at reasonable cost, a reasonable degree of package "customization." The clever vendor today seems to offer both the economics of standard packages and the "nuance" of custom development.

Caveat Emptor

Nevertheless, in spite of tremendous package improvements in recent years, the potential user must be careful. Here are a few initial items to consider when contemplating purchase of a package.

First consider who the vendor is. While size is not necessarily important it does suggest some past success and stability. Growth based upon nonperformance is exceedingly difficult in the systems business.

The vendor may be a recognized hardware supplier with an important market position and reputation to protect. This is probably the best situation in terms of guaranteed support, although not necessarily a guarantee of getting the best package. Remember, such vendors must work within the boundaries of their proprietary hardware capabilities — a reality which may not be in the best interests of the user.

A software house has primarily its package products to live on, but often suffers from thin capitalization and thus a need to install systems with payment taking priority over package performance and support.

If buying software from another user, the risk can be minimized by checking with other users regarding system suitability and vendor support. Questions to be asked include: Is training adequate? Is user documentation adequate? Have any systems errors been detected and how did the vendor react?

Users also need to know what hardware is offered and from how many different OEM suppliers. How well established is the software house/OEM supplier relationship?

Rapid component shifting can mean incompatibility from one package generation to the next. This can lead to obsolescence and an unforeseen major expense when an upgrade or enhancement is called for in the future.

Take Protective Measures

After thoroughly checking out the package vendor, users can take some other protective measures. For example, be sure that the system features are clearly defined in official documentation and that such documentation is referred to in a contract.

In dealing with a large vendor with a substantial user base, there is not much else the buyer can do.

The small software house with little or no user base must be dealt with differently. Policy is often nonexistent and there is often dire need for cash. If in doubt about the package, design a payment schedule that ensures the vendor's interest in the installation until it is certain there are no basic problems and that all claimed features are indeed included.

Schindler is executive consultant at Advanced Computer Techniques Corp., New York, N.Y.

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Shows Draw Hobbyists, Novices, Press

Boston

By Frank Vaughan
CW Staff

BOSTON — Computermania opened here recently amid massive publicity by the show sponsor that microcomputers have come of age.

But despite claims of 14,111 total attendance, the opening day crowd gave the appearance of falling quite short of the expected overflow crowds predicted by the show sponsors, *Kilobaud* magazine of Peterborough, N.H. The show did, however, draw visitors from most parts of the U.S. It also drew much of the international press corps, with the British Broadcasting Corp. and several Asian publications represented.

The Radio Shack Co. TRS-80 was one of the stars of the show as the under-$600 microcomputer system made its New

(Continued on Page 78)

Music enthusiasts found plenty to play with at PC '77.

Atlantic City

By Frank Vaughan
CW Staff

ATLANTIC CITY, N.J. — For the second straight year, the microcomputing people came to the Shelburne Hotel here for a computing show. Personal Computing '77 (PC '77) despite a competing show in Boston, was termed by most attendees and exhibitors an unparalleled success.

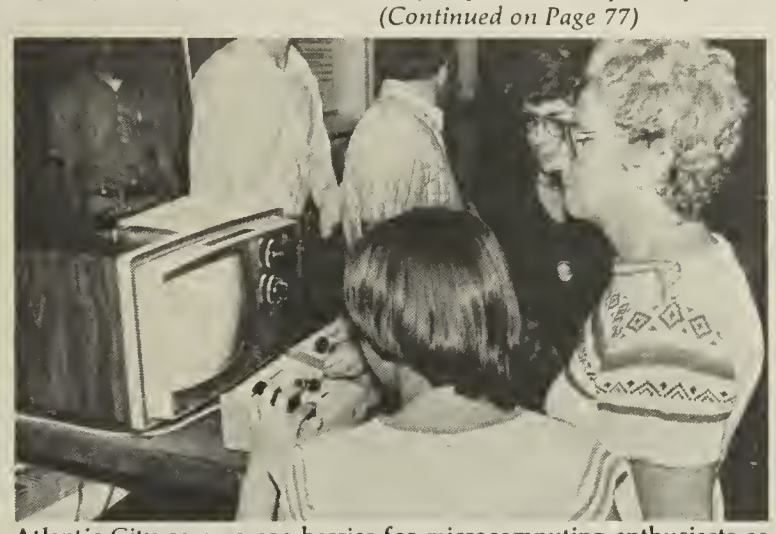
Estimated attendance for the two-day show ranged from lows of 8,000 to a high of 12,000. Exhibitors indicated that few of the show's visitors came "just out of curiosity."

Instead, they were generally people with a knowledge of microcomputing interested in seeing the latest state of the art.

The Heath Co. chose PC '77 to make the first public display of its kits line. At times it was virtually impossible to squeeze past the

(Continued on Page 77)

Trekkies and spaceship landing games gave the Boardwalk the look of a spacewalk.



Atlantic City saw no age barrier for microcomputing enthusiasts as young and old came to look, buy and play.

Exhibit Deceived Businessmen: Monosson

BOSTON — "The devastating deception for a businessman is a surface illusion that he can solve all of his business problems for $595 with a simple little computer . . . but he can't," Adolf G. (Sonny) Monosson, president of American Used Computer Corp., said after several hours of discussions with attendees at the recent Computermania show here.

The discussions caused him to realize that businessmen are being seriously misled by "the rising wave of personal computing," Monosson said.

The typical question the businessman asks is where he can get the $595 computer to do his job. He went around the show floor and didn't see it, Monosson said.

The computers demonstrated at the hobby show produced no printout for the businessman, they had inadequate memory systems for business and there was no software support, which meant the microcomputers couldn't be used in business without substantial software expense, he contended.

What the businessman saw were computers developed for the personal computer user — the technician, Monosson claimed.

Monosson challenged the idea that the microprocessor systems will be the salvation of the small businessman. "Digital Equipment Corp. was one of the first to introduce a microprocessor in its LSI-11 and never heralded it as a savior for anyone. People say that Digital didn't realize what it had, but maybe it did and maybe it realized the peripherals and software are far more expensive than the CPU," he said.

Monosson also claimed to have the only real business computer at the show, the Olivetti P-6060. He noted that it was not in the $400 price range, but priced at $8,950.

Because it was designed for the small businessman, the P-6060 has the capabilities the $400 systems lack, he said.

The small businessman must decide if he wants a $400 to $600 system that may or may not work with software; that he will have to bring in to a shop for repairs; that will not have adequate storage for records; and that either doesn't print or does so too slowly to be of real use, he added.

What users are seeing at microcomputing shows is a collection of technical ideas put together in a hodgepodge manner in their early stages of growth. This is of prime attraction to the technical person who has the capacity of fixing the system himself if it goes down or to the game player who sits at a console all day long and plays Star Trek, 21 or Tic Tac Toe.

These microcomputers have limited memory, which is fine for these limited tasks, Monosson said.

Monosson was upset with the description of microcomputers as "business computers." "It puts us on the defensive," he explained. "Many people would come to us and tell us they were very resentful. They came to the show and they looked for business computers and found nothing under $3,000 to $4,000 with software which could be maintained or supported to do the jobs they had heard could be done for $400, $500 or $600.

(Continued on Page 77)

Canadian Show Rescheduled

TORONTO — The Canadian Computer Show scheduled for the International Center of Commerce here Nov. 8-10 will introduce Canada's first Personal Computing Showplace.

Industrial and Trade Shows of Canada made the decision to stage the event on the same days as the Canadian Computer Show, rather than at a different time as had been planned, according to Robert Gowdy, general manager.

"Our original plan to overlap by only one day was adjusted in light of the fact that another consumer show of a different type was booked for the International Centre on the additional dates we had planned on using. We felt this might create traffic difficulties for our visitors and we have therefore rescheduled the Personal Computing Show to the same dates as the Canadian Computer Show," Gowdy said.

Gowdy stressed that the Canadian Computer Show will remain exclusively a trade show and that the general public will not be admitted to the exhibits. Visitors to the Canadian Computer Show will be admitted free to the Personal Computing Showplace, but the reverse will not be allowed, he explained.

Public admission to the Personal Computing Showplace will cost $5. Gowdy can be contacted through the Industrial and Trade Shows of Canada, 481 University Ave., Toronto, Ont. M5W 1A7, Canada.

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RCA Micro Kit Features OS in 4K Bits of ROM

ATLANTIC CITY, N.J. — An expandable hobbyist microcomputer kit called Cosmac VIP (Video Interface Processor) is available from RCA's Solid State Division. It was shown at PC '77 here.

The VIP is a complete microcomputer, offering an operating system in 4K bits of read-only memory, a spokesman claimed. VIP's output directly interfaces with a CRT or, when used with an FCC-approved modulator, a television receiver. Programs can be generated and then stored in an audio cassette tape recorder for later retrieval and use, he said.

Features 1802 MPU

The heart of the VIP is RCA's CDP1802 microprocessor unit (MPU). The MPU board comes with 2K bytes of random-access memory (RAM) using 4K-bit static RAMs, single-chip graphic video display interface, built-in hexadecimal keyboard, 100 byte/sec audio cassette tape interface and power supply.

The Chip-8 interpretive programming language has 31 instructions in a 2-byte format, the spokesman explained. The 512-byte operating system reportedly simplifies loading programs into RAM via the keyboard, recording RAM contents on cassette tapes and transferring tape-recorded programs into RAM. It also facilitates displaying memory bytes in a hexadecimal format on a CRT, stepping through RAM contents and examining the contents of the MPU registers, the spokesman said.

The VIP is expandable both on the printed circuit (PC) board and through connectors. RAM capacity can be doubled on the card to 4K bytes by adding four 4K-bit devices and can be expanded to a total of 32K bytes by adding further memory capacity through a 44-pin connector socket in the card. Parallel I/O expansion to 19 lines can be achieved on the PC card for use in music synthesizers, relays, printers or Ascii keyboards.

The hobbyist manual contains information on kit assembly, operating procedures, Chip-8 programming techniques, machine language programming, logic description, test programs and troubleshooting guides and system expansion instructions. The manual also includes instructions on using the hexadecimal keyboard.

The VIP is selling for $275 from RCA Cosmac VIP, New Holland Pike, Lancaster, Penn. 17604.

Group Forming in N.J.

ATLANTIC CITY, N.J. — A hobbyist group is forming in the Camden County, N.J., area. The group is open to any computer hobbyist and is not limited to computer owners. Information may be obtained by calling Gene Bomgardner at (609) 541-8296.

MICROCOMPUTING CLASSIFIED EXCHANGE

This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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Scheduled Micro Shows Stretch Across Nation

Trying to figure out how to schedule vacation time and money to take in a hobby computer show or two can be a trying affair. And it often seens like everyone else knows about the big shows, but the information never passes your way.

As a reader service, *Computerworld* will publish a regular listing of known microcomputer shows. Included in the listing will be the name of the show, date, location and the name and address to contact for further information.

Sept.17-18, Houston — **Houston Personal Computing Faire.** Contact: Foundation for Personal Computing, P.O. Box 22486, Houston, Texas 77027.

Oct. 5-7, Niagara Falls, N.Y. — **Micro-10.** Guideon Frieder, Department of Computer Science, State University of New York, Buffalo, Amherst, N.Y. 14226.

Oct. 7-10, New York — **The Great American Do-It-Yourself Exposition.** Contact: National Expositions Co., Inc., 14 W. 40th St., New York, N.Y. 10018

Oct. 11-12, Laurel, Md. — **Microprocessor Peripherals.** Contact: Applied Physical Laboratory, John Hopkins University, Laurel, Md.

Oct. 27-29, Chicago — **'77 Midwest Personal Computing Show.** Contact: Louise Garcia, Personal Computing Magazine, 401 Louisiana, Suite G, Albuquerque, N.M. 87108.

Oct. 28-30, New York — **Personal Computing Exposition.** Contact: Ralph Ianuzzi, H.A. Bruna & Associates, 78 E. 56th St., New York, N.Y. 10022.

Nov. 8-10, Toronto — **Personal Computing Showplace.** Contact: Derek A. Kidd, Industrial & Trade Shows of Canada, 481 University Ave., Toronto, Ontario M5W 1A7, Canada.

Nov. 28, Gaithersburg, Md. — **Personal Computing.** Contact: National Bureau of Standards, Gaithersburg, Md.

1978 Shows

April 28-30, Long Beach, Calif. — **Percomp '78.** Contact: James H. Lindwedel, Royal Exposition Management, No. 108, 1833 E. 17th, Santa Ana, Calif. 92701.

June 5-8, Anaheim, Calif.— **National Computer Conference & Computer Festival.** Contact: Steve Miller, Stanford Research Institute, 333 Ravenswood, Menlo Park, Calif. 94025.

July 23-25, Detroit — **Macc Computerfest '78.** Contact: Jim Rarus, Semco, Box 9578 North End Station, Detroit, Mich. 48201.

Aug. 25-27, Atlantic City — **Personal Computing '78.** Contact: John Dilks, Rt. 1, Box 242, Mays Landing, N.J.

West Coast Faires Slated

PALO ALTO, Calif. — The dates for the second and third West Coast Computer Faire have been set.

The second Faire will be held in the San Jose, Calif. Convention Center March 3-5, 1978, which is immediately following the Compcon show in San Francisco. The third Faire is set to take place in the Los Angeles Convention Center on Oct. 27-30, 1978.

In conjunction with the date announcements, Faire officials issued a general call for papers for both shows. The deadline for submissions is Jan. 2 for the second Faire and Aug. 28 for the third Faire.

Prospective authors are urged to contact Faire representatives before those dates to obtain format and topic information.

In a separate announcement, it was noted that the proceedings of the first Faire have been published and are selling for $12 a copy.

Faire proceedings, as well as information on past and future Faires, is available from Computer Faire, Box 1579, Palo Alto, Calif. 94302.

PC Held for Second Year

(Continued from Page 75)

Heath booth as the number of its visitors never seemed to let up.

Another exhibitor experiencing a large draw was Radio Shack with its TRS-80 display. The company reported that it sold "a lot" of kits during the two days and is "very pleased" with sales.

The popularity of the two exhibits was partially a result of the excitement generated by the two companies' entry into the microcomputer field.

Another exhibit with overflowing crowds was 2005 AD's exhibit. The people manning the booth were costumed in Star Trek attire and the main attraction in the display was a mockup of the controls for an unnamed type of spacecraft.

Visitors could, after a long wait in line, play a version of "Lander" on the large CRT screen in the mockup. "The people came here looking for a show, so we decided that we would give them one," one of the "Trekkies" explained.

Show organizer John Dilks, who works full-time for the telephone company and gave birth to the idea of the Atlantic City show a little over two years ago, seemed pleased with the show's success. "I was concerned for the success of the show, especially with the conflict in Boston, but the turnout here has been fantastic," Dilks said.

"We've outgrown the Shelburne and next year it will be in the convention center," Dilks added as he went from exhibit to exhibit with a massive blueprint in hand, selling space for next year's show.

Gary Coleman, president of the Midwest Affiliation of Computer Clubs (Macc), was named hobbyist of the year during the show banquet. Coleman, a Euclid, Ohio, resident, was cited for his role as prime organizer of the first and second Macc Computerfests in Cleveland.

All of the exhibits here were related to computing in one way or another. When the doors opened, only two booths were vacant, in stark contrast to the Boston show.

Visitors who attended both shows made note of the difference in exhibitor attendance and Dilks reported receiving several calls from exhibitors in Boston seeking booth space at his show. In fact, it was not unusual to see exhibitors sharing booth space.

The willingness to share booth space, coupled with the general excitement over the show, tended to give the exhibit place almost a carnival-type atmosphere. Despite the crowds and lines which stretched from the Shelburne out onto the boardwalk, few complaints could be heard — other than the occasional attendee lamenting the fact that his budget could not be stretched enough to buy all of the "goodies" on the show floor.

Dealer Hits Boston Show

(Continued from Page 75)

"What this show does is show that the personal computer is still at the level of the individual person, attracting the computer afficionado who wants to play, build and do his own thing — and there is nothing wrong with this, and the prices are becoming lower so that he can have one of these units to play with.

Programming

"This does not mean he can transfer it and use it in his business — not unless he invests a lot more money and does not care about outside support and programming," Monosson said.

"What this show has done is to point out — very, very bluntly — that the low-cost computer for the businessman has not arrived on the scene as yet. And what this show has done, more than anything, has hurt the potential buyer of small business machines who has visited this show [because] he has been disillusioned and misled in one form or another as to the fact that computers are not here for his needs," Monosson charged.

Monosson concluded his remarks with the warning that the businessman looking toward the inexpensive type of system to solve his problems should beware.

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CRT Expands to 16K Bytes

SUNNYVALE, Calif. — Video Terminal Technology, Inc. (VTT) has introduced its VT-4800 CRT featuring 4K bytes of installed random-access memory (RAM) that can be expanded to 16K bytes, according to a spokesman.

VTT's terminal also offers complete cursor control, cursor addressing by either keyboard or software, scroll up and down, five clearing functions, page increment and decrement, video inversion on any character, RS-232 serial I/O, user-strappable I/O codes and both composite and separate video outputs, according to the spokesman.

The VT-4800 printed circuit board, assembled and tested, costs $650. A kit version of the CRT sells for $1,195 and the assembled version costs $1,295 from the firm at P.O. Box 60485, Sunnyvale, Calif. 94088.

Exhibits Vacant in Boston

(Continued from Page 75)

England debut. Much of the show's local media blitz was based upon the Radio Shack entry, so the long lines at the triple booth surprised few of the visitors, who often had to squeeze past radio and television crews recording the action.

When the doors opened at 1 p.m., almost 40 booths were vacant with no indication as to the whereabouts of the vendors. One-fourth of these exhibitors arrived later in the day; by late afternoon the number of empty booths dropped to 30. Among the noticeably missing exhibitors listed on the program were IBM, Wang, 3M Co. and Texas Instruments.

The hobbyist entering the show floor with a thick wallet and a microcomputing shopping list could easily find almost every conceivable product. Chips, boards, tools, components, kits, interfaces and books stretched aisle to aisle. The person with money to spend could easily walk in empty handed and walk out with everything needed to build, operate and program the microcomputer of his choice.

The user could even be enlisted in the military — the Air Force, Army and Coast Guard manned recruiting booths. The Army even boasted a direct telephone connection to the largest job data bank in the world. The lines weren't too long at the recruiting booths, however.

The microcomputer hobbyist was not in the direct spotlight of the show. Instead, the small businessman with little or no computer knowledge was one of the prime targets. Many of the computer stores displayed systems that aimed at the small businessman — rather than Star Trek, backgammon and chess, accounts receivable, payroll and inventory programs seemed to be on most of the CRTs that adorned the hall.

Other significant exhibits included Imsai Manufacturing Corp., with a booth that dominated the show entranceway. The kit manufacturer displayed its line of micros and peripherals, including its 8085-based systems.

The Computer Warehouse had a large display which, in addition to retail hardware offerings, had artist Tom Huston showing his line of computer art, stationery, jewelery and T-shirts.

Seals Electronics, Inc. showed its line of custom and assembled boards. Jade Electronics had the largest components display, with a retail booth surrounded by uncountable packets of tiny parts and stacks of technical books. A Jade representative noted that many of the visitors had been at the Jade booth in other cities.

Some products that made their way onto the show floor seemed strangely out of place. These included digital automobile clocks with LED readout, police radar detectors and digital clocks.

And, of course, there was the inevitable microprocessor playing music from a great movie out of the past.

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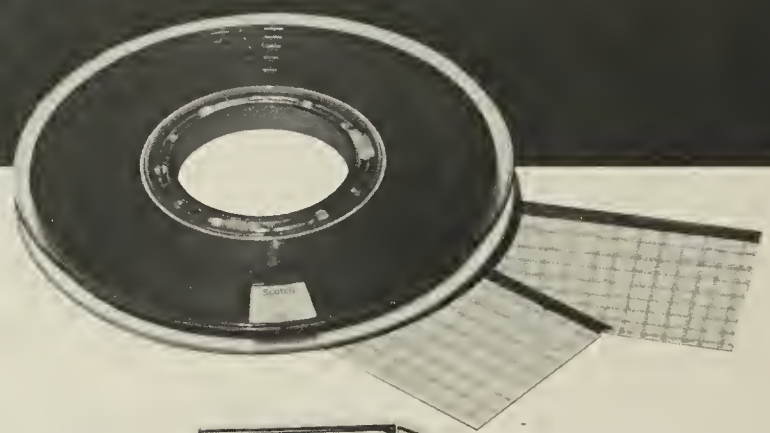

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Reflections On the Report Of the Privacy Commission

By Arthur A. Bushkin

At 9:15 a.m. on Tuesday, July 12, 1977, the members and staff of the Privacy Protection Study Commission met with President Carter in the Cabinet room of the White House to present him with the commission's final report, "Personal Privacy in an Information Society." Sitting there, listening to the President express his gratitude for our work and his commitment to these issues — he said that he would personally disseminate and discuss the summary of our report at the next Cabinet meeting — I was struck by the thought of how far we have come.

Just a decade ago a group of computer scientists, in response to the growing concern that all uses of computers could not be predicted or controlled, let alone deemed desirable, formed the Defense Science Board (DSB) Task Force on Computer Security. The group was headed by Dr. Willis Ware, who was later to become chairman of the Health, Education and Welfare (HEW) Secretary's Advisory Committee on Automated Personal Data Systems and then vice-chairman of the Privacy Protection Study Commission.

As a 24-year old graduate student, I became the secretary of the DSB Task Force, having "volunteered," as the junior member of the group, to keep the minutes. Now, 10 short years later, we were meeting with the President of the United States. To borrow a phrase, "we've come a long way, baby."

In 1967, two principal groups were concerned with the impact of computers on society: social and political scientists without a technical orientation and computer scientists and technologists. The proposal for a National Data Center had just been defeated in the public forum of the Congress, and this was one of the first significant examples of a formal public policy debate regarding the effects of computing on individuals.

Computer scientists who followed this issue were motivated, perhaps a bit unknowingly, by two main themes.

First, there was the realization that, without adequate safeguards, "wrong things" could happen to, or as a consequence of, the use of computers.

Second, and probably more important, the issue of a national policy on the use of personal information was only delayed, not resolved, as a result of the withdrawal of the National Data Center proposal. In a piece of little-noticed testimony, Dr. Paul Baran told a congressional committee that, in the future, there would be networks of interconnected computers. As more and more data bases of consequence were automated, the effect of such networks would be the same as a national data center, although there would be no centralized form of control.

In short, as any computer scientist knew, future technological developments were certain to raise the same issues again. It was just a matter of time.

Admittedly, our perception of the problem in the late 1960s was somewhat limited. The "undesirable social consequences of computing" was too vague a subject area to address, whereas "misuse of computers by technologically sophisticated penetrators" was not only possible, it was also an area of immediate concern and funding, and hence, subject to investigation.

Thus, for the next five years, the field of computer security focused on the detection and prevention of the misuse of computers by individuals who were presumed to be as technically sophisticated as the computer security specialists themselves.

By the early 1970s, however, the intellectual boundaries of the computer security field began to expand. The technologically unsophisticated, but dishonest, user of the computer system came to be perceived as a threat at least as serious as the technologically sophisticated penetrator.

While the latter might still be tempted to crack systems in order to steal national defense secrets, tales of accountants, clerks, bank tellers and managers misusing computers for their own personal gain began to abound. The field of computer security now had a cousin: computer abuse.

The release of the HEW Advisory Committee report in 1973 also firmly planted the seed of another idea, namely, that there were right and wrong ways to use computers, even when there was no thought or indication of premeditated abuse or misuse. The Code of Fair Information Practice which was presented in that report not only received widespread attention but, a year later, became the intellectual underpinning of the Privacy Act of 1974.

The field of privacy, or personal information policy, was officially born and, fittingly, the Privacy Act also established a federal commission to study the problem. Now, with the report of the Privacy Protection Study Commission being made public — there are still several appendices yet to be released — it is important to take stock, not only of where we have been but also of where we are going.

Use of computers through the 1960s was mainly confined to the automation of previously manual recordkeeping practices. By the mid-1970s, however, the broad availability and low cost of computer and telecommunications technologies provided both the impetus and the means to perform new recordkeeping functions. Indeed, countless recordkeeping practices have arisen that would not have been possible without computers and telecommunications.

The problem is, however, that *information policy has not kept pace with information technology.* Questions of the impact of computers on society have hardly been raised, let alone adequately debated and resolved.

Whenever topics like technology and society or the social responsibility of scientists arise, however, the mind usually leaps to images of graduate seminars or conference panels; one does not generally think of these areas as the grist for daily endeavor. Likewise, the government regulation of scientific development — as, for example, in the areas of nuclear engineering or genetic research — is not something generally associated with the computer field, except perhaps in the area of telecommunications.

Unfortunately, the Privacy Commission's experience documents the extent to which consideration of the social impact is a missing ingredient in information system development.

The issue of accurate information is perhaps the best example of an area in which information system design and development and their subsequent impact on people have not always meshed as well as they could or should have. Ever since I could first program a computer, friends and acquaintances would regale me with stories of "computer errors" — incorrect bills and the like. I would patiently point out that the computer only did what it was told — after all, what else was there to say?

(Continued on Page 80)

In Depth: Privacy

(Continued from Page 79)

Unfortunately, the "information explosion" of the past few decades, coupled with the dramatic developments in computer and telecommunications technology, has brought us to the point where recorded information now commonly substitutes for direct contact between individuals and organizations. And whereas erroneous information used to be a mild inconvenience, it is now becoming an increasing source of unfairness to individuals.

Throughout the commission's recommendations, there are a number of recurrent themes regarding accuracy, some of which are (1) that individuals should have a right to see and obtain a copy of a record maintained about them; (2) that individuals should have a right to correct or amend a record about them, including the right to file a statement of explanation or disagreement; and (3) that recordkeeping organizations should bear an affirmative responsibility to transmit corrections of erroneous information, regardless of whether the correction was initiated by the organization or the individual, to both sources and prior recipients of that erroneous information.

The Privacy Commission Meets

While the commission recommended varying methods and degrees of implementation of these concepts, the basic thrust remained constant: that the designers and managers of information systems have a responsibility to ensure the recorded information does not itself become a source of unfairness to the individual, and that the individual has a right to participate in the recordkeeping process.

And who could disagree? No one favors unfairness; no one supports the maintenance of inaccurate information. Indeed, one would expect that information systems are already designed with fairness and accuracy in mind.

Yet organizations frequently make no provisions for verifying the accuracy of the data they maintain, particularly when that data has been obtained from another organization rather than from the subject of the record. Instead, there is often a general presumption of accuracy, timeliness and completeness with respect to the information in the record.

Similarly, organizations rarely transmit corrections (which they discover) of erroneous information back to the sources and forward to the prior recipients of that information. Partially as a result, the commission's recommendations contain a number of affirmative requirements in this regard.

Missing the Point

An equally important issue, though, is that of redress of grievances, of due process with respect to information systems and recordkeeping organizations. An aggrieved individual must have some means for righting the wrongs that have happened to him, not just as a result of inaccurate information but as a consequence of any aspect of the recordkeeping process. Interestingly, the issue of computer security will not only serve as an illustrative example, but it will also demonstrate how far public policy in this whole area has come.

The commission found that the federal agency response to the Privacy Act's provision requiring adequate safeguards for personal information ranged from no response at all to, in the case of some automated systems, "technological overkill." At computer conferences this is also probably the most cited provision of the act, usually in some context that implies that, with passage of the Privacy Act, safeguards or security are now mandated.

Curiously enough, this interpretation misses the essential point of the Privacy Act's safeguard provision.

Without delving deeply into the legislative history of the Act, it still can be confidently asserted that the safeguard provision of the act was not intended to mandate a change from an agency's existing practice, simply because there is a presumption that most agencies are already employing adequate safeguards. Rather, the provision provides the foundation for a "cause of action" — the legal term for the basis upon which a suit is brought — for an aggrieved individual in those cases in which he believes that agency practices are not adequate or have caused him some harm or injury.

In other words, the safeguard provision (particularly as it would be technically amended by the commission's recommendations) is premised upon the assumption that most agencies are already using good information management practices. What is new, though, is that an individual now has a basis upon which to bring suit against the federal government — the government consents to be sued by waiving sovereign immunity — if he

(Continued on Page 82)

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In Depth: Privacy

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believes that an agency is not implementing the provision properly.

Thus, the impact of the safeguard provision, which most computer scientists instinctively view as a technical provision, is actually predominantly in the legal domain, in the sense that it is not intended to impose new practices on an agency.

But it is the more mundane provisions, like the one that requires an agency to propagate corrections of erroneous information, that are intended to levy new requirements on recordkeeping organizations. It is precisely these provisions, which have profound technical implications, that are most often ignored by computer scientists. Little attention has been paid, for example, to the requirements for descriptor and routing data in data base management systems.

There is an interesting circle here. The initial response of the computer community to the social issues of computing was in the area of computer security, and the response was largely technical. Now, however, there is a safeguard provision in the Privacy Act with essentially legal implications.

On the other hand, the simple process of collecting, maintaining, and disseminating accurate information has not been adequately implemented over the past decade, with the result that we are now seeing laws (as well as commission recommendations) that essentially tell the recordkeepers, and the computer scientists, to do a better job.

Privacy may be a social issue, but its most significant technical implication will be, in my judgment, not in the area of safeguards or security, but in the simple requirement to develop systems, techniques and procedures for keeping information about people accurate, timely and complete.

No Retreat

My own sense of the situation is that we are now at a turning point. Both public policymakers and computer scientists will have an important responsibility in the next few years, and to ignore this responsibility would be to turn our backs on the "fallout" from the information explosion.

Policymakers will have to grapple with the subtle and illusive issues of information policy. As the commission rightly observes, we live, inescapably, in an "information society." Few of us have the option of avoiding relationships with recordkeeping organizations. Each of us acts out the events and transitions of our lives with organizations as attentive partners, and each of our countless interactions with these organizations leaves its trail in the records they maintain about us.

There is no turning back, no retreat, from the information society that we have become. We must address the issues of information policy candidly, fairly and quickly.

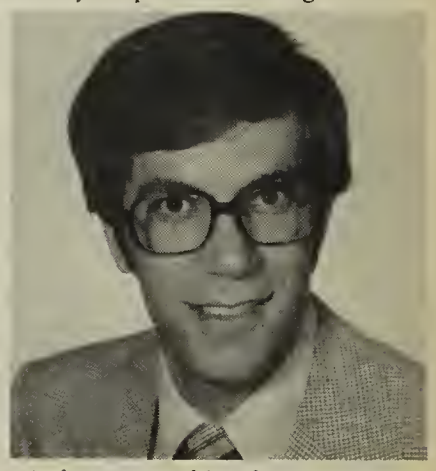
Public policy is, however, an inherently general statement of a social goal. Legislation, as a reflection of public policy, is also inherently general in nature. In its suggestions for revising the Privacy Act of 1974, for example, the commission concentrated specifically on policy objectives rather than on the particulars of implementation.

The commission's goal in this regard was simple: to allow for changing information technology and diversity of organizational information needs and uses, as well as to foster the constructive creativity that is frequently inhibited by overly restrictive requirements.

But computer scientists, system designers and technologists are accustomed to dealing with precise specifications, with functional requirements, and not with generalities. It will be their responsibility, however, to translate these broad statements of public policy into the details necessary for information system design and development. No one else will, or should, do it for them.

It is my hope that technologists and computer scientists will view this responsibility as a challenge. I find it somewhat disconcerting that so few computer scientists are familiar with the HEW Code of Fair Information Practice and that so many speeches are still being given equating privacy with security while no mention is made of the data base management aspects of privacy.

The impact of computer technology on society is no longer some vague abstraction suited only for the classroom or the conference; it is now part and parcel of our daily lives, and my sense is that the computer community is up to the challenge.



Arthur A. Bushkin has been in the computer field since 1962 specializing in protection of data, privacy and information policy.

He was staff technical advisor for the Privacy Protection Study Commission, where he was manager of the Privacy Act Assessment Project as well as manager of the Technology Assessment Project.

He is also co-author of The Privacy Act of 1974: A Reference Manual for Compliance, *published by Systems Development Corp. (SDC). While at SDC Bushkin was one of several senior technical staff members on a computer security contract for the Department of Defense's Worldwide Military Command and Control System.*

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The Waves of Change

By Charles P. Lecht

Users are not the only ones confused by the current proliferation of microcomputers and minicomputers — manufacturers are, too. "The degrees, dimensions and deployment of systems distribution are the key confusion factors," Lecht contends in the latest excerpt from his soon-to-be-published book.

CHAPTER IX

In Chapter I, we noted that today's waves of technological change have obscured our earlier, well-packaged, nicely defined concept of a computer system. Thus it should come as no surprise that there are no universally accepted definitions of the terms "microcomputer" and "minicomputer."

Therefore, it would be well to preface our discussion of the impact of such devices by establishing some working definitions which, while they may not satisfy all readers, can at least serve to indicate "boundaries" for each of these product classes. These boundaries, like so many others struggling to maintain their integrity in today's fluid DP environment, will certainly change by the end of this decade — caveat lector.

• *Microcomputer* — includes one or more microprocessors which perform logical and arithmetic functions under program control (firmware and/or software), and usually consists of one or more LSI ($\geq$ 100 active gates) chips; also included is some read-only memory (ROM) and/or random-access memory (RAM). Today, many microcomputers are limited to 65K or less words of 4-, 8-, 12- or 16-bit size. They provide some I/O interface logic and a limited complement of I/O devices.

"Typical" prices for microcomputer chip sets *without* I/O devices or power supplies range from under $100 to over $1,000 each, depending on functional capability and memory size characteristics. Examples include the widely accepted Intel 8080 chip, the Texas Instruments TMS 1000 and the Motorola 2901.

• *Minicomputer* — includes a miniprocessor (and may, in addition, incorporate one or more microprocessors). It performs logical, arithmetic and I/O functions under program control at speeds typically five to 10 times faster than microprocessors. The mini memory address range is usually wider than found in microprocessors, with sizes extending from 65K to over 262K words.

The minicomputer price range varies considerably, depending on features included. From a low-end figure of about $10,000, the cost may rise to something considerably in excess of $100,000 for the processor with some ROM/RAM storage and I/O interfaces (but excluding I/O subsystems). In general, the mini price will be under $50,000.

Model Designation:	8	8/S	8/I	8/L	8/E	8/F	8/A
First Delivery	5/65	9/66	3/68	9/68	3/71	11/72	10/75
Min. CPU Price ($ Thous.)	18.0	10.0	13.5	10.0	5.0	4.0	2.5
Cycle Time (Microseconds)	1.5	1.5	1.5	1.6	1.2	1.2	1.2
Total Installed (July 1974)	2,350		6,900		14,950		-

Figure IX-1. DEC PDP-8 PRODUCT HISTORY (12-bit word)

Figure IX-2. AVERAGE YEARLY PRICE PDP-8 WITH 4K MEMORY (In Thousands)

SOURCE: Bache, Halsey, Stuart, Inc.

The performance ranges of some minicomputers can overlap those normally thought of as falling in the domain of "large" mainframes, such as the IBM 370/158. In this context, "mini" and "large" assume additional meaning as qualifiers, since the former may match the capabilities of the latter — at much lower prices (in terms of raw Mips [millions of instructions per second] — a somewhat controversial measure).

The market for minicomputers (and microcomputers/microprocessors) has been highly price-elastic. Rapid shipment growth over the past decade has been spurred by an average price decline of 22% since the Digital Equipment Corp. PDP-8 was first shipped in 1965 (Figure IX-1). Technological innovations have enabled minicomputer and microcomputer designers to make processing power cheaper, penetrating markets highly sensitive to price/-performance.

By designing more power and funtional capability into their units while maintaining price levels characteristic of those belonging to preceding generations, DEC, Data General, Interdata and other minicomputer vendors have been able to penetrate markets for more advanced applications.

Major new micro/minicomputer products have been introduced at (more or less) 15-month intervals over the past few years. Average processor and memory prices for these products have declined at about a 20% (or greater) annual rate. However, processor and memory cost constitutes an ever-*decreasing* part of the total computer systems cost while micro/mini peripherals and software/services costs represent an ever-*increasing* portion of the total cost pie.

For example, the software (utilities, compilers, applications, et al) required by the typical buyer of today's $50,000 minicomputer can involve large multiples of the basic hardware price. In addition, the trend toward more complex systems has nearly offset the price declines of low-end systems, flattening the declining trend in average unit prices (see Figure IX-2).

The fact that market expansion has continued despite the trend toward average unit price stablization suggests the importance of functional elasticity as an additional factor in the demand equation.

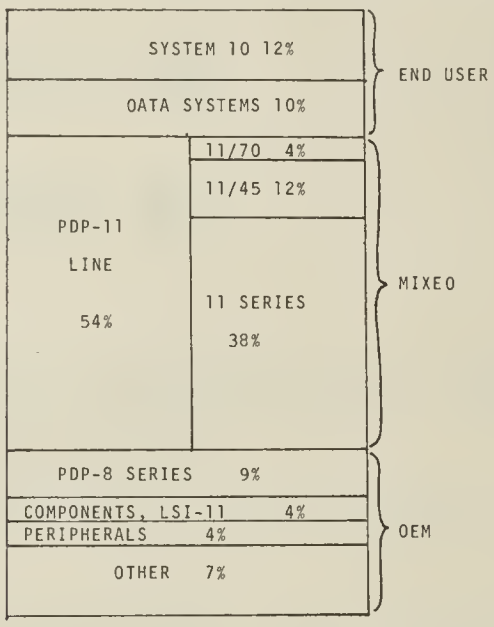
Rapid expansion has also resulted in market fragmentation, with each emerging segment characterized by its own set of multidimensional criteria (industry, function, customer sophistication, etc.). We use the word "characterized" more in the hypothetical than in the practical sense, since a well-defined industrial and/or functional marketplace segmentation which provides a clear basis for product definition continues to elude product planners.

Minicomputer companies have developed families of general-purpose processors which were originally targeted for process control-like ap-

(Continued on Page 84)

In Depth: The Waves of Change

Figure IX-3. ESTIMATED BREAKOUT OF DEC 1976 SHIPMENTS (Total $574 Million)



SOURCE: Bache, Halsey, Stuart, Inc.

Figure IX-4. ESTIMATED MINICOMPUTER (AND MICROCOMPUTER) COSTS PER SYSTEM

	Unit Shipments	Value ($ Mil.)	Value/ Unit	% Decline
1967	2,750	$ 220	80.1	
1968	4,600	272	59.1	26
1969	8,100	355	43.8	26
1970	11,100	415	37.4	15
1971	13,500	377	27.9	25
1972	22,600	500	22.1	21
1973	33,900	770	22.7	3
1974	50,000	1,085	21.7	4
1975	71,000	1,430	20.1	7
1976	96,000	1,820	19.0	5

Source: International Data Corp.

(Continued from Page 83)

plications. Moving these into the business arena to do payroll, accounts receivable, etc., hasn't been an easy task. Their entry, at the very onset, represented a horizontal, shotgun approach to the marketplace.

The readiness of end users in the early 1970s to purchase mini/microprocessors is more properly traceable to the economic conditions prevailing at the time (conditions that persuaded end users to "make do" with lower priced, "cheapie" processors) than it is to the perceived sufficiency of those processors to meet more exacting user needs, already provided for by better accoutred, "classic" products.

As time passed, the market/product mappings improved, causing mini/microprocessors to account for a larger share of the business systems marketplace. Furthermore, the shotgun has now been replaced by the rifle, allowing for vertical penetration increases (Figure IX-3).

Vertical Integration

Partly as a consequence of the trends mentioned above, some of the major mini vendors have launched integration of the manufacture of their own peripherals, terminals, memories and other electronics at a pace well ahead of their competitors. The principal advantages to be gained by this approach include the following:

- Increasing complexity of system configurations (mentioned earlier) means that a greater share of overall system value is represented by peripherals, memory and software (Figure IX-4). In Figure IX-5, note the lower share of system value represented by the Digital Equipment Corp. CPU in the increasingly popular higher value systems (PDP-11/40 and 11/45) vs. the traditional PDP-11/05 OEM configuration.
- In-house peripheral and integrated circuit manufacture allows the larger manufacturers to capture a greater share of the total system value-added, a consideration of special importance to their business in Europe (where independent miniperipheral manufacturers remain relatively noncompetitive).
- Improving technology and lower prices have turned low-end CPU manufacture into a low-margin commodity business, with reduced opportunities for product differentiation and premium pricing. Peripherals, memory, software and services have held up eroding profits on low-end products, which are often priced as entry vehicles for capturing subsequent higher margin upgrade businesses.
- A comprehensive line of standard CPU, peripheral and memory components gives some mini vendors the flexibility to construct system packages which more directly address the needs of vertical markets.

	PDP 11/25 OEM Configuration		PDP 11/40 Batch Configuration		PDP/40 4 User Timesharing		PDP 11/45 Large Scale System	
	$	%	$	%	$	%	$	%
CPU & Minimum Memory	$6,495	50%	$12,995	28%	$12,995	21%	$23,900	12%
Features	320	2	590	1	590	1	5,830	3
Memory	-		5,200	11	12,580	21	63,800	31
Magnetic Storage Media	2,990	23	19,700	42	21,845	36	76,025	37
Terminals	3,225	25	3,225	7	12,900	21	3,225	2
Card I/O	-	-	4,860	10	-	-	2,400	1
Printer							30,000	15
Total Peripherals	6,215	48	27,795	60	34,745	57	111,650	54
Total System	$13,030	100%	$46,570	100%	$60,910	100%	$205,180	100%

FIGURE IX-5. COSTS ASSOCIATED WITH VARIOUS PDP-11 CONFIGURATIONS

In order to successfully carry out the product strategy suggested above, the mini/micro companies need to achieve economies of scale in all product lines through volume shipments. Thus, one or more of the following strategies suggest themselves:

1. Retain and preserve experienced employees while improving productive capacity thorugh inventory building.
2. Form a special components group to help build volume on processors, peripherals and other electronics.
3. Control price concessions and liberal credit terms to lock in higher volume, recurring OEM business. Incidentally, OEM sales by the mini vendors accounted for the lion's share of their revenues in the past; this trend is now being reversed (see Figure IX-3).

With lower costs should come the ability of some manufacturers to sustain market leadership through pricing flexibility and development of additional standard components and configurations (see Figure IX-6). Further cost benefits for higher volume include:

- Economies of distribution and maintenance, made possible by higher geographic installation and shipment densities.
- Additional units over which to spread the fixed expense of developing sophisticated software systems, as well as additional R&D funds to develop applications software for penetrating new markets.

Mini Market Shares

Market shares of the major suppliers are shown in figures IX-6 and IX-7.

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In Depth: The Waves of Change

(Continued from Page 84)

According to Bache, Halsey, Stuart, Inc., a respected Wall Street investment brokerage and market analysis firm, "Digital ranks first and will maintain that position indefinitely. Hewlett is currently in second place, with prime emphasis on larger systems aimed at time-sharing use and for sophisticated industrial automation applications.

"IBM's apparent strong showing is the result of its overpriced and aging System/7, sold into three or four specific narrow markets where massive IBM support can be used to justify the prices.

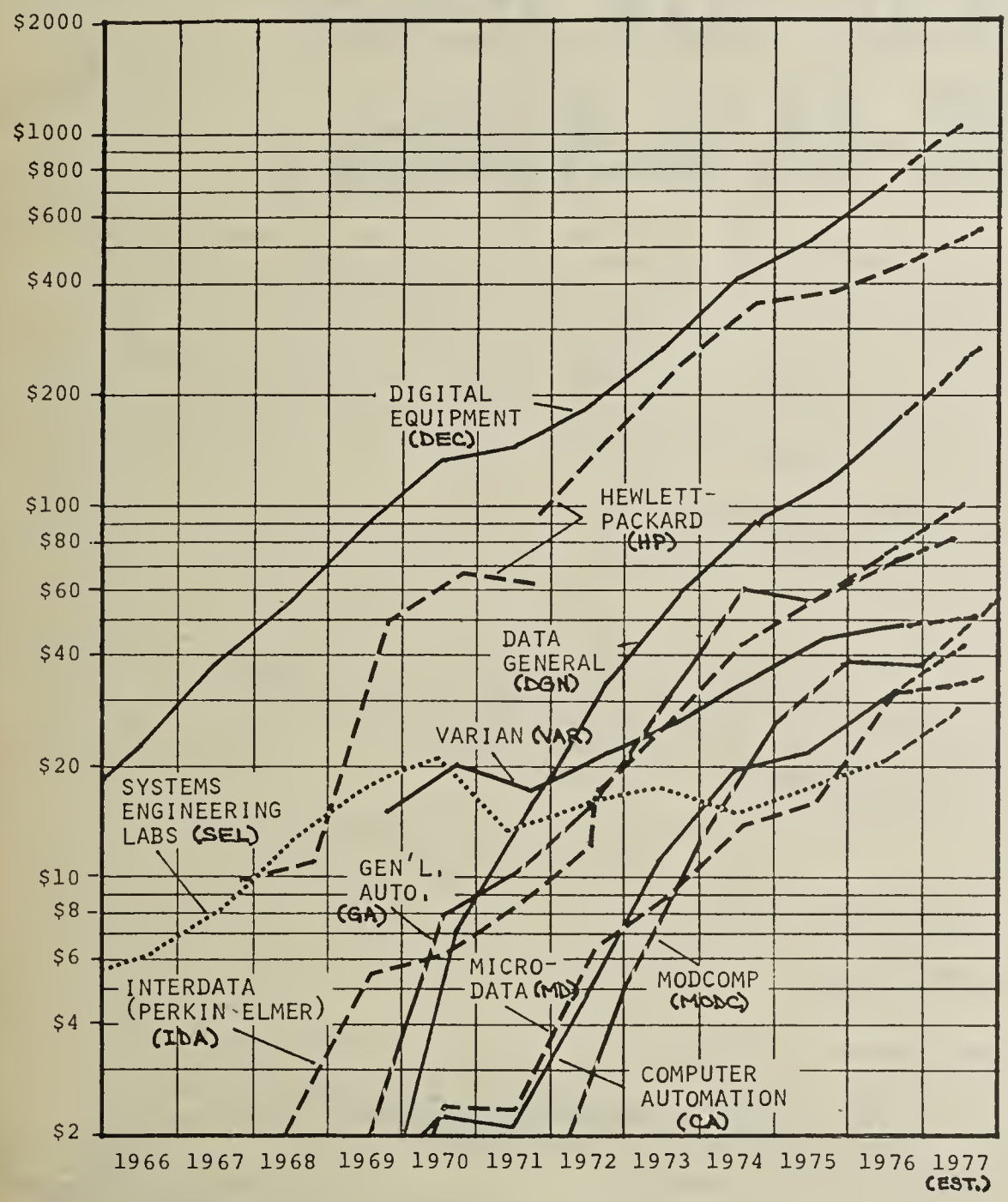
"Data General's seemingly distant fourth place is deceptive. Data General is the fastest growing mini supplier of size and is following a strategy similar to Digital's in placing as many systems as possible, laying the groundwork for future larger volume sales.

"General Automation has been growing rapidly, but a series of problems impacted growth in the past year. Honeywell emerges from relative obscurity with its new mini line, which has been quite successful in Honeywell mainframe accounts."

However difficult it is to track the market shares of the larger mainframers (IBM, Honeywell, Burroughs, Sperry Univac, NCR, Control Data Corp., etc.), it is substantially more complex a task to establish the minicomputer market positions with any degree of accuracy. However, it is clear that DEC is, effectively, the "IBM of the minicomputer market" and that, together with IBM, Hewlett-Packard and Data General, it forms the top tier of that market.

Honeywell, General Automation, CDC and others represent the second tier market, although it should be noted that the gap in market shares that separates the two tiers is of formidable width.

Figure IX-6. MINICOMPUTER REVENUES OF SELECTED COMPANIES (IN MILLIONS)



SOURCE: Bache, Halsey, Stuart, Inc., updated by ACT

The years shown along the horizontal axis represent the fiscal or calendar basis of financial reporting used by each of the indicated companies, depending on their individual practice. All 1977 figures are estimates based upon ACT's sources of information. In millions they are (from top to bottom): DEC, 1050; HP, 575 (figures include minicomputers and scientific calculators, and have been reclassified from 1971 onward); DGN (including Digital Computer Control results as pooled), 260; IDA, 100; GA, 81; MODC, 56; VAR (revenues of data products group, now part of UNIVAC operations), 51; CA, 43; MD, 36.5; SEL,28.

Reaons for Demand

According to C. Casle, a Bache, Halsey, Stuart, Inc., vice-president, there are five major factors stimulating minicomputer demand:

1. "Continual declines in semiconductor costs are passed along in minicomputer pricing, expanding existing market opportunities and opening new ones. This trend appears unlikely to change for several years."

2. "Manufacturing processes, office practices and regulatory compliance are increasing in complexity. Apart from other considerations, these spur automation simply to cope with the burdens additional complexity causes. The minicomputer is a primary automation tool independent of process."

3. "Labor costs continue to rise, minicomputer costs continue to fall. Each increment of change adds to the number of situations where automation becomes financially attractive." Consider, in this context, the cost of a given mini as compared with the average cost (in salary alone) to the employing U.S. company of a single clerk — $8,000 to $10,000.

4. "Semiconductor performance gains are being passed on by minicomputer makers as improved access to automation and computation. Each increment widens the number of people that can access computers and reduces the complexities of use. This trend appears to be continuing."

5. "Electronic arbitrage. Mini makers sell cheap what mainframe vendors rent dear. Some leading edge users, such as Citibank, Hartford Insurance and others, are taking advantage of hardware price discrepancies. This trend is in the formative stages since the level of sophistication required to successfully play the arbitrageur role is very high."

Impact on Mainframes

The mini/microcomputer or component suppliers will *not*, in my judgment, severely impact the major mainframes for the following reasons:

• When the *system* purchase price exceeds roughly $100,000, the cus-

(Continued on Page 87)

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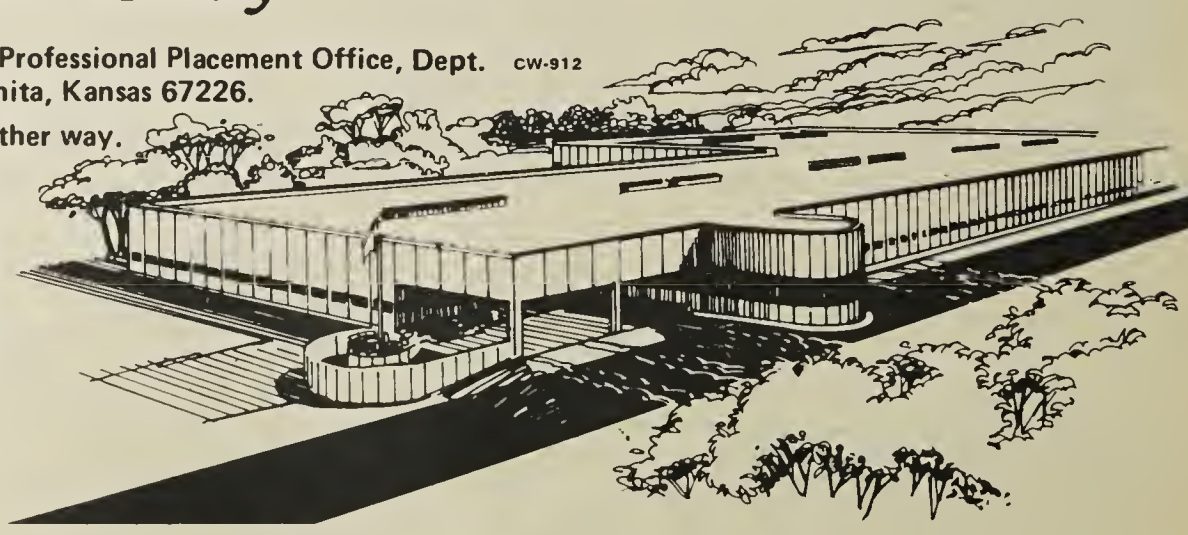

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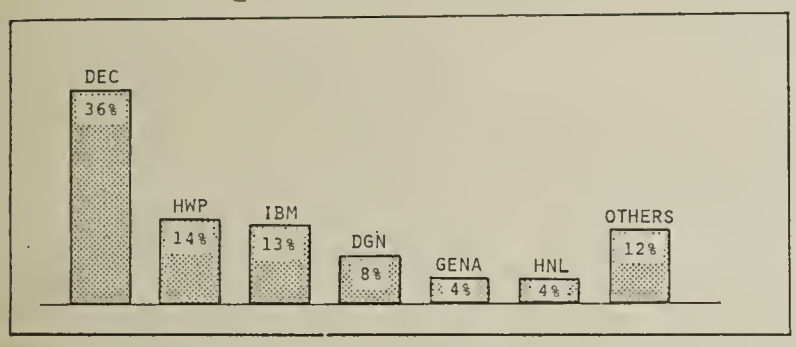
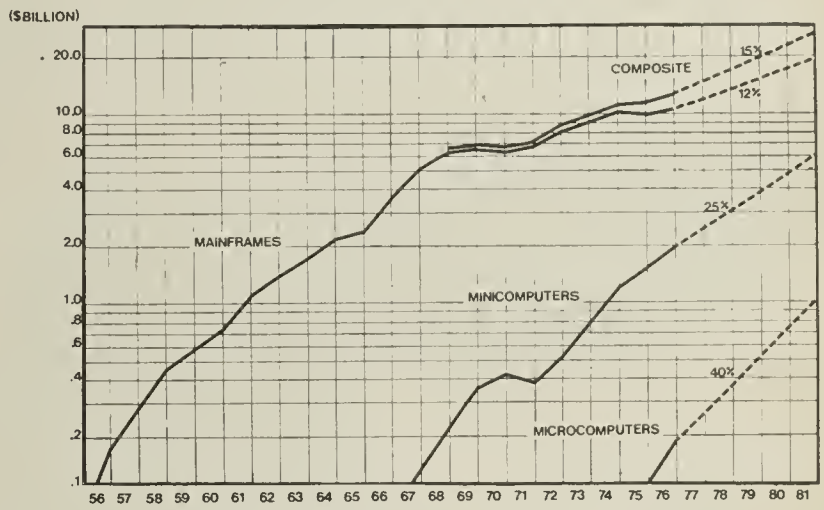
Figure IX-7. ESTIMATED SHARES OF 1976 MINICOMPUTER SHIPMENTS OF $2.0 BILLION



SOURCE: Bache, Halsey, Stuart, Inc., updated by ACT

Figure IX-8. ESTIMATED SHIPMENTS & COMBINED TOTALS BY YEAR



(Percentages Represent Growth Rate Projections)

SOURCE: Bache, Halsey, Stuart, Inc.

(Continued from Page 85)

tomers generally become more concerned about software, support, maintenance and vendor viability (not raw hardware price/performance).

- The price war between the mini/-micro and component suppliers will continue to force the price down, and the resulting profit margin erosion will force many smaller firms out of business.
- As minicomputers attempt to penetrate the medium to large-scale general-purpose markets (IBM 135 and up class, although the definitions of medium to large are rapidly changing), the quality and selection of I/O devices are increasingly important.
- Future customers (1980s) will be more and more interested in security, flexibility, adaptability, operational human factors, application development and maintenance capability — not "raw" CPU power or bits and bytes. Besides, many low-end computer systems are I/O or peripheral limited anyway.

Furthermore, *all* of the major mainframers or systems competitors are gradually replacing hard-wired logic modules with microprocessors. In so doing, they are attempting to enhance or expand their current system performance, improve reliability, accessibility and serviceability, reduce size and power requirements and lower costs.

Figure IX-8 clearly shows the current and projected high annual growth rate for microcomputers (40%). However, this significant growth is from a relatively low shipment base of about $200 million last year. Minicomputers also enjoy a growth rate (25%), which is presently estimated to be more than twice mainframe shipments (12%).

However, mainframe shipments may pick up in 1977-78 as the IBM 138/148/3033 machines begin to be delivered in volume). Moreover, since large minicomputers tend to overlap so-called mainframes, one must not depend on the absolute values. Figure IX-8 only shows a relative trend over time.

At least a dozen important applications for microprocessors in traditional medium to large-scale systems can currently be identified:

- Front-end communications processors.
- Remote concentrators/multiplexors.
- Maintenance processors.
- Disk controllers.
- Magnetic tape controllers.
- Hierarchical storage controllers.
- Memory access controllers.
- Nodal processors (in a network).
- Terminal controllers.
- I/O processors (replacement for channels).
- Intelligent terminals.
- Encode/decode devices.
- Office automation.

Collectively, the above list represents

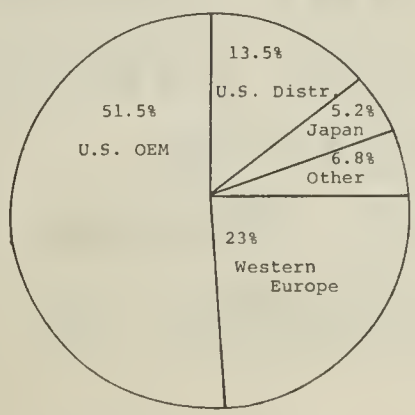
(Continued on Page 88)

Figure IX-9. EXAMPLES OF MICROPROCESSOR PRODUCTS

Supplier	Model
Advanced Micro Devices	2901 AM9080A
American Microsystems, Inc.	S9209 S6800
Electronic Arrays	9002
Electronic Memories and Magnetics	PC25
Fairchild Camera & Instrument	PPS-25 F-8
General Instrument	LP 8000 CP-1600
Harris Semiconductor	IM6100
Intel	4004 4040 8008 8008-1 8080 8080A 3000
Intersil	IM6100
Monolithic Memories	6701
Mostek	5065 F-8
Motorola	M6800 2901
National Semiconductor	IMP SC/MP PACE
Panafacom Ltd.	PFL 164
RCA	CDP-1801 CDP-1802
Rockwell	PPS-4 PPS-8
Scientific Micro Systems	SMS 300
Signetics	2650
Solid State Scientific	CRD-8
Texas Instruments	SPD0400 8080 TMS 1000 TMS 9900
Western Digital	CP-1600

Figure IX-10. SEMICONDUCTOR BOOKINGS - 1976

(Includes: Microprocessors, ROM/RAM, and other IC's)



TOTAL WORLD = $ 3.85 Billion

SOURCE: ACT estimates from WEMA data

In Depth: The Waves of Change

(Continued from Page 87)
a very substantial portion of the system's "added value" and revenue. It is important to realize that only two or three microprocessor performance levels are required to handle the above dozen or so functions and that many systems will require multiple usage of the same type processor(s) (see Figure IX-9) for fail-soft operation.

Price/Performance Factors

The potential performance capability of a microprocessor or miniprocessor depends on many interrelated and interdependent factors:

- Processor speed is determined by CPU cycle time, instruction set size, efficiency and "richness" and efficient memory (ROM/RAM) utilization.
- Input/output capability depends on the number of I/O channels or ports, the channel band-pass or width, etc.
- Memory speed and range (ROM/-RAM) can be critical if multiple applications are planned, and speed or capacity range will often represent a key limiting factor in the overall performance equation.

Price represents the most important criterion for many users, especially at the low end of the microprocessor spectrum (e.g., single-chip 4- or 8-bit products such as the Mostek 3870, Intel 8748, Texas Instruments 9940, TMS1100, etc.). However, wherever practical, price must be evaluated on the basis of the answers to a wide range of critical questions.

For example, how much ROM/RAM is included? Are additional supporting circuits required (for I/O functions or power supplies, etc.)? Are second sources available? What is the current track record of the vendor in terms of credibility, financial stability, availability of supporting software (tools)?

Summary of Trends

Looking ahead to the near term (1977-80), there will be:

- Greater competition between IC vendors and mini/microcomputer suppliers.
- Greater competition between mini/microcomputer suppliers and general-purpose mainframe manufacturers.
- Increasing consolidation/mergers of IC/mini/micro, miniperipheral and mainframer companies to obtain economy of scale and more added value (vertical integration).
- Far more emphasis placed on software and end-user support services.
- More cost-effective, larger word size machines (32 bits) and memory ranges.
- Substantially increased usage of mini/microcomputers in distributed systems networks as "nodal" processors or terminal processors.
- Use of 64K-bit memory chip in products by 1979 (Figure IX-10).

Today's industrywide preoccupation with distributed systems is heavily influencing product planning in the mini/micro arena. If users are confused with the power and scope of current systems offerings, it appears that the manufacturers are too. The degrees, dimensions and deployment of systems distribution are the key confusion factors. These issues (and others) will no doubt be clarified in the future.

Meanwhile, users are confronted with the dilemma of choosing between multiple mini/micro vs. maxi power. Can several midgets successfully compete with one tall basketball star?

It depends on the court.

Lecht is the author of four previous books on computer-related matters: The Programmer's Fortran II and IV, The Programmer's Algol, The Programmer's PL/I *and* The Management of Computer Programming Projects.

He is president of Advanced Computer Techniques Corp., which he founded in 1962, and has lectured widely for such groups as the Association for Computing Machinery, American Management Association, American Society for Information Science and the Data Processing Management Association.

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Low-Speed Printers Holding Their Own

WALTHAM, Mass. — Despite the allure of inkjet technology, lasers and the 45,000 line/min speeds offered by the much-touted high-speed printers, low-speed printers are holding their own.

In fact the value of the installed base for printers that operate below 3,000 line/-min is expected to grow from $3 billion in 1976 to over $6 billion in 1981, according to *EDP/Industry Report* (EDP/IR), a newsletter published by International Data Corp. (IDC) here.

EDP/IR highlighted several trends which will be apparent throughout the rest of the decade:

• "The technology at the slower speeds is evolving. Matrix printers are taking over from fully formed character printers; bank technology is invading line printers; nonimpact devices are blossoming."

• "Major OEM acccounts are going in-house with printer production, hoping to add to the reliability of their products while trimming costs . . . and meanwhile keeping the OEM market in flux."

• "Microprocessors are adding function to output devices as variable fonts, increased print control and error detection find their way into the industry's new products."

Printers with speeds over 3,000 line/min will lead the overall market, growing from 2% of dollar value in 1975 to 15% of value in 1981, but the low end of the market — printers with speeds from 10- to 30 char./sec to 600 line/min — will nonetheless experience an annual growth of about 20%, the report noted.

Line printer shipments will grow from 60,000 units this year to almost 75,000 units by 1981, a year in which OEM revenues could well amount to over $250 million, EDP/IR projected.

While slow-speed line printers have traditionally found their niche at general computer sites, by 1981 installations at small business computer sites should be a rival, the newsletter proposed.

"Growth will come from the large base of matrix printer users in the small site and minicomputer base as users fleet up to the faster devices as their output needs increase," it stated.

By 1981, the U.S. installed base of character printers should be about one million units, equal to abut 75% of all printers used with general-purpose computers, minicomputers, terminals and shared-logic word processors.

IBM Trial 'Non-Event': Stock Analysts

By Molly Upton
CW Staff

As the U.S. vs. IBM trial drones into its third year and nears the changing of the guard from the government offense to IBM's first display of its defense tactics, several stock market analysts discount any near-term effect of the trial on stock market activity.

However, one analyst said he sees a slightly higher probability of a consent decree.

The Justice trial is a "non-event" as far as the market is concerned, according to John McManus, vice-president of Kuhn Loeb & Co.

Another New York analyst indicated the trial is not expected to be a real factor in investment considerations over the next year or so.

Other cases can have more of a psychologically damaging impact to investors' views of IBM than the Justice Department's action, he continued.

Gideon Gartner, a vice-president at Oppenheimer & Co., believes the probability of a consent decree is higher than it has been in the past.

If the Justice Department asks Judge David N. Edelstein to grant interim relief on certain items, logically it could then take those conditions to IBM as the basis for a consent decree, he said.

However, this thought is probably too optimistic because the chances of Justice being granted relief are slim, according to Gartner. Justice would have to prove that the public is being irreparably damaged and that the terms of the relief would not irreparably harm IBM, he said.

But, he continued, "it's about time someone came to their senses." The trail's duration is not doing the Justice antitrust staff, IBM or the competitors any good.

James Blair, first vice-president of White Weld & Co., said the only effect of the trial on IBM stock would be if something significant happened in terms of a settlement. That doesn't look like it's in the offing, he added.

Whereas two or three years ago analysts' commentaries were full of speculations over terms of a consent decree, analysts have now come to accept the fact that no premature ending is on the horizon, Blair said. They are thinking this litigation is going to drag on forever, he pointed out.

"I think this is in large part the result of IBM's successes in court. You could hardly call Greyhound a setback for IBM — it's basically just reopened another item of litigation. But IBM has not been penalized for litigating other than the management time and expense associated with it."

"I don't think there appears to be any great incentive for IBM to accelerate settlement here, and thus I don't think we're going to

(Continued on Page 92)

SSA Revises RFP for OCR Gear As Result of Vendor Protest

By Edith Holmes
CW Staff

WASHINGTON, D.C. — The Social Security Administration (SSA) is amending its specifications for optical character recognition (OCR) equipment as the result of a protest made by a small California-based firm, Information International, Inc.

The SSA request for proposals (RFP), issued in August for what is expected to be the largest purchase ever of OCR equipment by the federal government, was designed to accommodate the agency's present scanning devices, according to Dr. F.N. Karmatz, an Information International consultant.

Those devices are largely of IBM and Recognition Equipment, Inc. (REI) manufacture, Karmatz noted.

The SSA failed to ask for "an overall — equipment and labor — solution" to the problem it faces in complying with a congressional directive that the agency share Social Security information with the Internal Revenue Service (IRS), he said.

Under the legislative changes aimed at eliminating duplication of effort by the SSA and the IRS, the agencies will both be reading new W-2, W-2P (pension) and W-3 (summary) forms. Public Law 94-202 eliminates the need for almost five million employers to file quarterly 941 reports to the SSA.

The SSA must now handle 158 million earnings items or about 70 million documents filed by these same employers, however.

"Conservative estimates" indicate that these documents, prepared on a great variety of computer printers, typewriters and accounting machines, will translate into 32 billion characters of information that have to

(Continued on Page 92)

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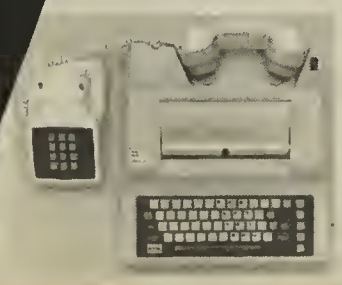

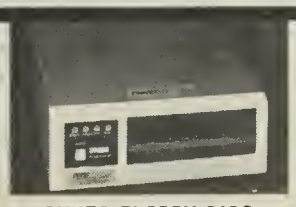
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SSA Amends OCR RFP After Vendor Protest

(Continued from Page 91)

be correctly processed by the SSA by 1979, Information International stated in a "white paper" on the project.

The California firm charged that "the technicians who prepared the RFP have taken a narrow and 'safe' approach by limiting their procurement to types of equipment they are already familiar with — paper scanners which [the SSA] has used for the past eight years. SSA has asked for a device rather than a system."

Information International believes it has a system, a microfilm reader-OCR system, that will more than satisfy the SSA requirement that its new equipment be able to scan 94% of alphabetic characters and 96% of numeric characters.

The firm's Grafix I system microfilms raw documents at up to 20,000/hour; its OCR equipment then reads the film, having generated a permanent record of the documents.

The British Health and Social Security Department is currently employing Information International's system with a 99.1% eficiency rate, and the system has literally paid for itself in savings over 14 months of use, the company claimed.

The U.S. Navy is also using the Grafix I system for handling data records.

Ability Demonstrated

On June 16, Information International demonstrated its capability to read the new W-2 and related forms for an SSA team and proved its system could outperform the agency's RFP requirements by a margin of three to two in the area of rejected forms and by a margin of nine to one in the area of substitution corrections.

The agency would need a minimum of 7,300 people to process the rejects and make corrections if it is to fulfill the RFP scanning requirements with the kind of equipment it has now. No more than 635 people would be required to achieve the same results, however, if the Grafix I were used, Information International said.

"The RFP is also written to procure the least expensive machine that will meet its specifications. It ignores the fact that it will take additional equipment and human effort to read the great volume of incoming data which the low-cost scanner does not read, and it ignores the much larger labor cost that is required to correct the errors introduced by the scaning devices themselves," the company added.

Admittedly, a Grafix I system costs several times more than a single paper scanner, Information International noted, and the system reads microfilm instead of scanning paper.

But because the SSA already microfilms all its forms for its record depository, the Grafix I would use this source at no additional cost to SSA.

Had the RFP gone unamended, the agency would have locked itself into "a self-bankrupting system that would cost taxpayers an extra $1 billion to $1.5 billion over a five-year span, the expected life of the new system," Information International said.

Following the firm's protest, the SSA sent a letter to interested vendors advising them that it would amend its RFP to include nonpaper-reading scanners. The agency also promised to revise its cost projections for the procurement and extended the reply date for the RFP from Sept. 8 to Sept. 29.

At press time, Information International was waiting to receive the new technical SSA specifications.

The agency's final decision will be made on the basis of total cost to the government, not just the initial hardware price tag, an SSA spokesman said.

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Until now, most small systems users have relied on backup, off-site files for protection of vital company records . . . with the need for costly, time-consuming updating and inherent "information lag". Others have relied on "false security" measures such as fireproof rooms or buildings (which contain many combustible furnishings and supplies plus ducts which permit rapid heat transfer to the computer room), sprinkler systems (which can ruin EDP equipment if activated), or gas extinguishing systems (which are costly and may not activate before heat reaches destructive levels).

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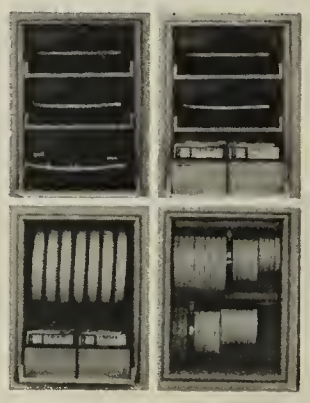

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Analysts Show Apathy to Trial

(Continued from Page 91)

see anything evolve in the near term. That's what stock prices are all pretty much assuming," he commented.

Looking at the litigation IBM faces now and in the future, Blair said he tends to think the more significant trial in the near term might be the Memorex case. That action is tentatively scheduled to begin in January.

Extrapolating from the performance of the Memorex executives on the witness stand for the Justice Department, Blair said he would be more concerned about IBM's outcome in that case.

"Probably the only thing that has come out of the Justice effort is the forerunner to what might evolve out of the other cases," he added.

But Gartner, said he's not sure investors have discounted the Justice trial as a factor. They're saying it on the one hand, but the price does not necessarily indicate that, he said.

There was some disagreement over the impact of the Greyhound decision ordering the case back to trial. One analyst indicated that since IBM's stock is so closely balanced between buyers and sellers, the decision might have an impact on portfolio managers who remember the days of the Telex decisions and the 100-point drop in stock within a year.

They may prefer to postpone any buying action for a while, he said.

But McManus said the Greyhound decision should have no effect on IBM stock. Although it is a setback, one must remember that IBM has yet to show its defense and "I think it can defend its position," he said.

To Approach $3 Billion

Rigid Disk Drive Revenues Seen Peaking in '79

By Toni Wiseman
CW Staff

MOUNTAIN VIEW, Calif. — The moving head rigid disk drive industry sold an estimated $1.87 billion in disk drives worldwide in 1976, and 91% of this volume was shipped by U.S. manufacturers.

Based on existing or announced products, the industry can anticipate a peak in revenues in 1979 at $2.95 billion, with a slight decline in 1980 to $2.91 billion, according to a report by James N. Porter, a management consultant.

Worldwide revenues for U.S. manufacturers should reach $2.66 billion in 1979 and $2.81 billion in 1980, according to Porter's *1977 Disk/Trend Report.*

"It is considered likely that new products not yet announced will prevent any decline in actual sales at the end of the decade," the report stated. "The forecasted average annual growth rate (AAGR) of 12% through 1980, representing the effects of old age in the product life of several of today's products, will be exceeded if significant new products are introduced at rates similar to past experience.

"A reasonable estimate of AAGR on this basis is 18% to 20%, which would place 1980 total revenues at $3.6 billion to $3.9 billion," it said.

Moving head rigid disk drives are produced by 23 U.S. manufacturers, plus 11 in Japan and Western Europe.

About 70% of all drive revenues represents captive prodution, and the remainder are produced by the plug-compatible manufacturers (PCM) and OEM market, the report stated.

'Confusing' Industry

"The industry structure can be confusing, even to industry participants, but follows most of the classic rules for free-market industries: Noncaptive manufacturers sell drives, alone or with related hardware, directly to every type of industry participant.

"Questions of technical capability, manufacturing facilities and quantity requirements control whether various industry levels buy directly from the drive manufacturer or through a reseller," *Disk/Trend* noted.

The report pointed out that vertical integration has been a strong trend in the industry, noting that with the exception of IBM, all the U.S. captive drive producers used to be OEM drive customers for all or part of their requirements.

IBM holds about 40% of the drive market, compared with its 70% share of the mainframe market. The PCM programs of several drive manufacturers, which displace potential IBM revenues, and the disk drive requirement of the minicomputer segment, which IBM has only recently addressed, account for the difference in market shares, the report stated.

"The short-term loser in market share is the PCM business, which held 14% in 1976, but will drop to 9% and stabilize at that proportion, as independent manufacturers hurry their 3350 drives to the market to replace lost 3330 shipments," *Disk/Trend* predicted.

The report forecast fixed disk drives will account for more than half of all drive revenues by 1980. Worldwide shipments of fixed disk drives up to 12M byte will grow from $87.7 million in 1976 to $340.1 million in 1980, while drives with over 200M byte will grow from $219.5 million to $849.7 million.

Decreases are expected in most disk cartridge and disk pack drives as well as in data module drives.

Disk cartridge drives up to 12M byte will drop from 23.5% of shipments in 1976 to 12.5% by 1980, pack drives of 29M byte to 58M byte will show a similar decline from 7.2% of shipments to 3.3% while those with more than 100M byte will drop from 35.% to 11.6%, the report predicted.

Data module drives' market share will also drop, from 13.7% to 1.2%.

Disk cartridge drives of 12M byte to 55M byte, on the other hand, will see an increase in market share, from 1.1% in 1976 to 5.6% in 1980. Storage module drives of 25M byte to 80M byte will also see an increase, from 2.7% of total shipments to 11.5%, the report stated.

Competing Techiques

No competing technology is likely to have a significant impact on the market for moving head rigid disk drives prior to 1980, *Disk/Trend* stated. "Several emerging technologies will, however, find specialized segments of the data processing market responsive to the new capabilities offered, even at comparatively high prices.

"The production programs thus initiated will lead to future cost reductions which probably will have a greater effect on disk drives later in the 1980s," the report said, noting that so, the one feature offered by disk memories not under attack by competing technologies is removability.

For further information on the *1977 Disk/Trend Report*, contact James N. Porter, 1224 Arbor Court, Mountain View, Calif. 94040.

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Chances Slim for Penetration of Soviet Market

By Bohdan Szuprowicz
Special to CW

Is there a Soviet market for Western computers?

At first glance the answer would appear to be yes, since several spectacular sales of large Western computer systems to the Soviet Union have been widely publicized. But whether a worthwhile market share can be realized in the Soviet market by any Western computer manufacturer is another question altogether.

Yet that should be the main objective when attempting to penetrate this potentially huge but centrally controlled market with Western equipment, which is much more advanced than domestically manufactured Soviet computers.

This basic issue, although completely overshadowed by strategic technology transfer considerations, has resurfaced once again with the controversy over the export license for Control Data

International News

Corp.'s Cyber 76, which was sold to the Soviet Hydro-Meterological Institute two years ago.

The Cyber 76 is one of the fastest Western computers on the market with processing speeds in the order of 10 million to 12 million instructions per second, while the top Soviet machine at present is still the venerable BESM-6 which is rated at 0.8 million to 1 million operations per second. The top Soviet Riad computer, the EC-1060 that was finally reported to have been put into production in June 1976, is still rated at 1.5 million operations per second, well below its original design speed.

Thus it is argued by some that shipment of a Cyber 76 to the Soviets would be tantamount to giving the Russians computer technology that would allow them to increase by a whole magnitude their state of the art in large computer manufacture. This is particularly relevant because since 1974 the Soviet Academy of Sciences made no secret of the fact that it is building a prototype BESM-X, now to be known as BESM-10, which it hopes will reach speeds in the 15 million operations per second category.

But the market for such big number-crunchers is limited and academician Dorodnitsyn, director of the computer center of the Soviet Academy of Sciences, stated in 1974 that probably no more than 100 to 150 such large systems will be installed ultimately in the whole Soviet economy, as well as exported to major institutes in East European countries to replace their BESM-6 machines.

So far the Russians have not announced their BESM-10 prototype, which was supposed to go on the air during 1977. Since they obviously have a significant investment in that program already, it is very difficult to believe that they would not want to get some helpful ideas from the Cyber 76 once it is installed in their territory.

Aside from any possibility of diversion of the Cyber 76 for strategic use, the issue is basically one of a fair market share for Western manufacturers in return for such an advance in the state of the art.

So far chances are that once the Russians get their BESM-10 on the air, Control Data or anyone else is unlikely to make another sale of a Cyber 76 in the USSR, Eastern Europe or even India.

A look at the history of Western computer exports to the USSR during the last 1970-1975 Five Year Plan may prove illuminating.

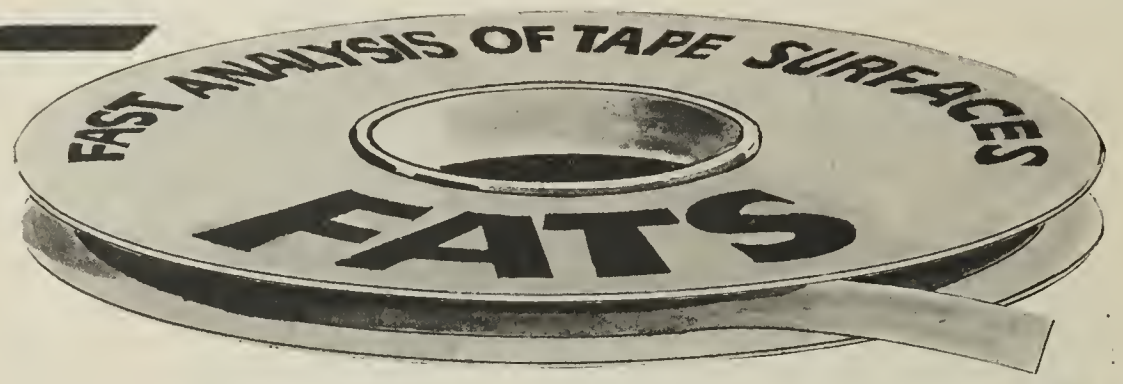
About 200 Western computers have been sold during that period, of which about 50 are relatively large machines such as ICL 4-70, ICL 1906, IBM 360/50, IBM 370/155, Univac 1106, HIS 612, Siemens 4004, CDC 6200, Burroughs 6700, Iris 80 and similar models in great variety.

The other computers consist of small machines and minicomputers such as the HP 2000 series, DEC PDP-11, Mitra 16, Varian 627, Logabax, IBM System 3, Ferranti Argus 700 and a few other models, many of which were shipped as integral parts of various plants sold to the Soviet Union on a turnkey basis often in return for a fair price or even raw materials.

But what is interesting to note about the imports of single Western computer installations is the fact that most represent different computer models from different Western manufacturers, except in a few cases where the nature of the application required a dual system for reliability.

It appears as if someone behind the scenes orchestrated the importation of representative models of the latest obtainable and most advanced Western computers. When offers of large numbers of used IBM 360 computers and later IBM 2314 and 2319 disk drives comparable to Soviet Riad equipment only now being manufactured were made at very attractive prices, these have been consistently rejected.

The total value of all those Western computers exported to the Soviet Union in the last Five Year Plan period is in the order of $150 million realized over five years by at least 20 manufacturers from the UK, France, Germany, Sweden, Japan and the U.S. This just about averages at $1.5 million per year per manufacturer, which is less than what some salesmen are selling within a single block of Manhattan.



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Commerce Foresees Minis Boosting Dutch Imports

THE HAGUE, The Netherlands — The economic recession reduced imports of computers and related equipment by The Netherlands during 1975, and available information for early 1976 indicated that little if any, improvement should be expected.

International News

After 1976, however, economic recovery should lead to renewed growth, according to a U.S. Department of Commerce report.

Minicomputers will open up a completely new market here and contribute substantially to the improvement of the total import figures, Commerce added.

In 1973, The Netherlands imported computers and related equipment valued at $153.9 million, of which $45.4 million were U.S. imports. By 1975, total imports grew to $229.8 million with U.S. equipment claiming $63.64 million.

In addition, for the first four months of 1976, U.S. imports accounted for $20.9 million of total imports of $72.7 million, according to Commerce figures.

"U.S. suppliers hold a dominant position in The Netherlands' computers and computer related equipment market," the report indicated.

"Domestic production is mainly in the hands of U.S. subsidiaries, except for Philips, the Dutch multinational, which produces some minicomputers and peripheral equipment with a special attraction in the Dutch market."

Commerce noted that while the U.S. position in the mainframe sector is secure, strong European competition is being encountered in the peripheral area.

Foreign Orders & Installations

Ontario Hydro has ordered a Univac 1100/42 system to be installed at its System Control Center in suburban Toronto.

South African Coal, Oil and Gas Corp., Ltd. has ordered Honeywell instrumentation equipment worth $11.5 million to monitor the world's largest oil-from-coal complex.

Shell Canada Ltd. has ordered a Flic system from Metromatication International, Inc. to be installed in its research facilities at Oakville, Ont.

Prestil Eclair, a zipper manufacturer in Rouen, France, has ordered a Model 7110 system with six terminals for order entry ap-aplications from Inforex, Inc.

Six European banks have ordered IBM 370/158 and 370/168 add-on memories from Electronic Memories and Magnetics Corp.

D. Stempel AG, West Germany, has ordered a high-speed, multihead large-format graphics scanner from Optronics International, Inc.

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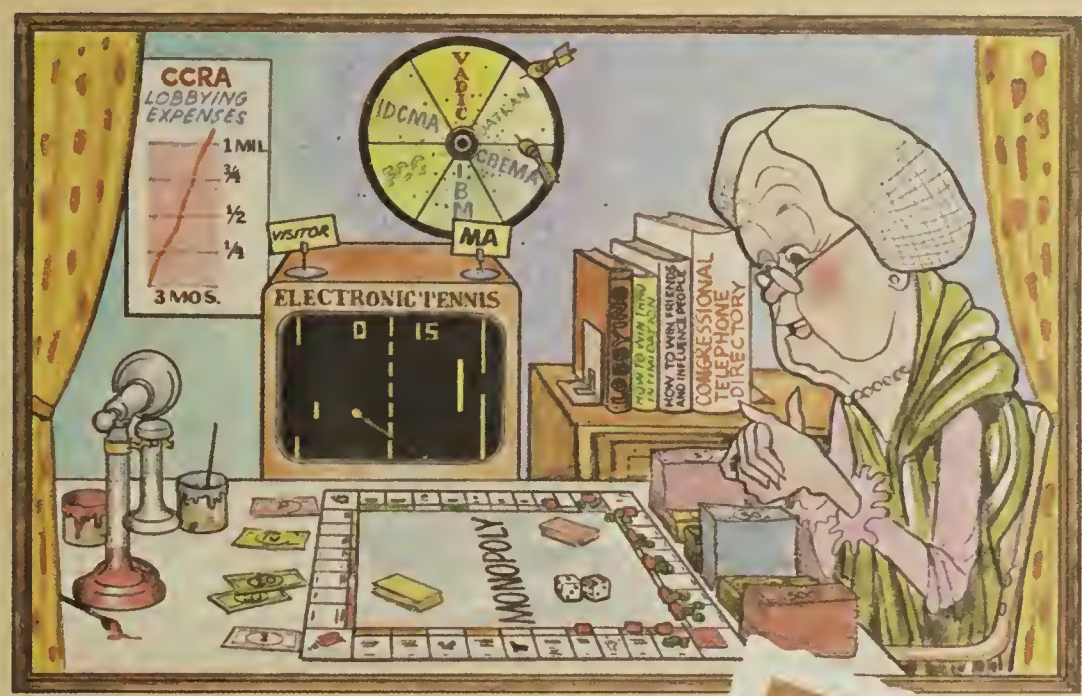

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SBS to Start Satellite Experiment This Fall

McLEAN, Va.— A communications experiment known as Project Prelude will be conducted this fall by Satellite Business Systems (SBS) in association with Comsat Laboratories and other companies.

The Project Prelude experiment will use the National Aeronautics and Space Administration's (Nasa) Communications Technology Satellite (CTS) to test emerging concepts for intracompany communications, including high-speed data transmissions, teleconferencing and facsimile, according to an SBS spokesman.

The experimental transmission of high-speed digitized communications will be at the higher frequencies of the 12-and 14-GHz bands, at which CTS operates.

These communication transmissions will be a prelude to advanced commercial communications to be available in the 1980s to meet intracompany needs of large organizations, the SBS spokesman explained.

Three business organizations will participate in the satellite experiment: Rockwell International Corp., Texaco, Inc. and Montgomery Ward and Co., Inc.

SBS is making arrangements with leading communications equipment manufacturers to supply terminal equipment at each site for the experiment.

Project Prelude will provide an opportunity to plan and develop equipment for high-speed and high-quality transmission capabilities required for future satellite systems, according to the spokesman.

The capabilities and performance of the manufacturers' advanced prototype equipment will be evaluated in a realistic business environment, he said.

The six participating manufacturers are: Advent Corp.; Arvin Echo Corp.; Dacom, Inc.; Harris Satellite Communications Division of Harris Corp., which will supply a multi-data rate, high-speed modem employing QPSK modulation; Hewlett-Packard Co. which will supply a computer systems network; and NEC America, Inc.

The experiments will employ two small transportable earth stations, built by Comsat Laboratories. Each of the participating business organizations, in turn, will have the pair of earth stations installed at their selected sites for several weeks, the spokesman noted.

During the experiment, data will be gathered on user acceptance, economic impact and equipment performance. An evaluation will be published in a report to Nasa and the Federal Communications Commission (FCC), he said.

The experiment is under the overall direction of SBS, which is a partnership formed by wholly owned subsidiaries of Comsat General Corp., IBM and The Aetna Casualty and Surety Co.

SBS has been authorized by the FCC to establish an all-digital, 12/14 GHz satellite system to serve businesses, government agencies and other large communications users.

AIIE Planning Conference On Federal DP Procurement

WASHINGTON, D.C. — A government-industry computer conference on "Federal ADP Procurement: 1978 — The Year of Transition" is being presented by the American Institute of Industrial Engineers (AIIE) in cooperation with key military and civilian agencies.

The conference will be held Nov. 14-16 at the Twin Bridges Marriott Hotel here.

The conference will focus on federal ADP procurement issues from two perspectives: policy agencies, represented by the Office of Management and Budget, the General Services Administration and the National Bureau of Standards; and user agencies, represented by the Department of Defense, military and major civilian agencies.

The first day of the conference will offer a status report on major issues given by executives in organizations with governmentwide responsibilities for ADP policy and implementation.

The second day will consist of a series of parallel sessions, stressing agency experience with ADP procurement practices and addressing key issues that affect internal agency procedures. Sessions include: "Teleprocessing Services Program (TSP)", "Developing the Request for Proposal (RFP)," "Management Session: Department of Defense," and "The Post RFP Process."

The third day will feature a panel discussion on proposal evaluation.

Further information is available from Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

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Executive Corner

Amdahl Announces Key Appointments

SUNNYVALE, Calif. — Amdahl Corp. has announced a series of key management appointments representing the executionary phase of a management enhancement plan previously approved by its board of directors.

Eugene R. White, Amdahl president since 1974, has been appointed deputy chairman.

John C. Lewis, formerly group president of Xerox Business Systems, will succeed White as president, while William F. O'Connell, formerly director of IBM World Trade large systems marketing, has been named senior vice-president, corporate marketing.

Other Changes

- Joseph A. Orlando has been elected executive vice-president of Technicon Corp.
- Daniel A. Hosage has been named vice-president and general manager, communications management products for Datapoint Corp.
- William A. Clarke has been selected as vice-president, business development for On-Line Business Systems, Inc.
- Irwin J. Kusel has been named vice-president of systems and consulting at Cogna Systems Corp.
- James S. Conners has been named vice-president and area manager of National Sharedata Corp., the Western Union Teleprocessing division.
- James Peacock has been named vice-president of International Data Corp. (IDC).
- Philip Schneider has been named vice-president of Advanced Westar for the Western Union Telegraph Co.
- John F. Graham has been named director of Honeywell Information Systems' Industrial Design and Human Factors Department.
- Allan T. DeVault has joined Digital Development Corp. as director of marketing.
- William D. Jobe has been named vice-president for North American sales for Data General Corp.

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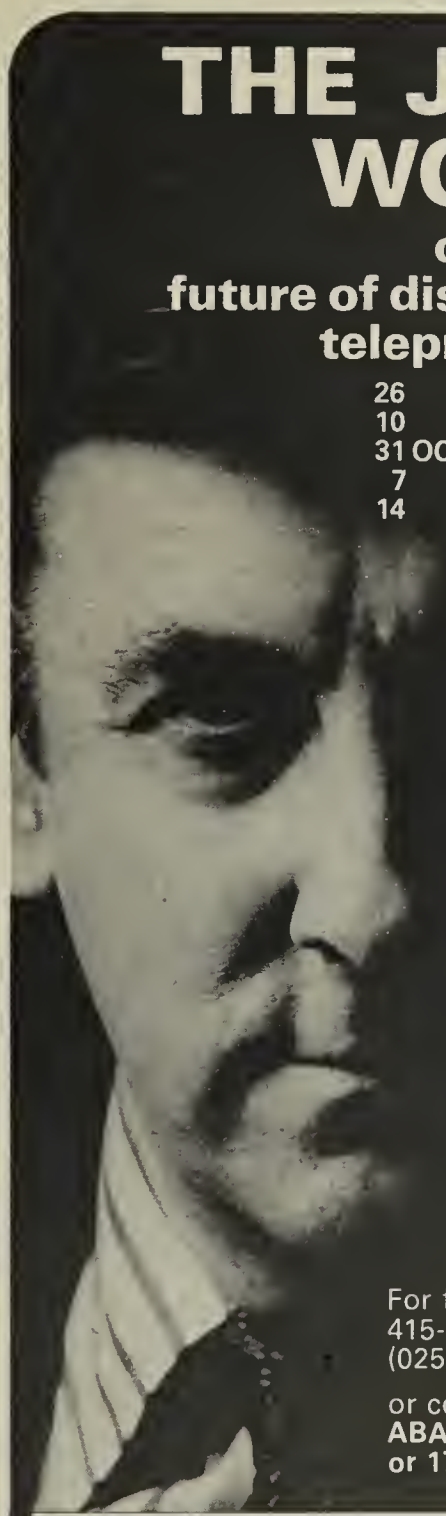

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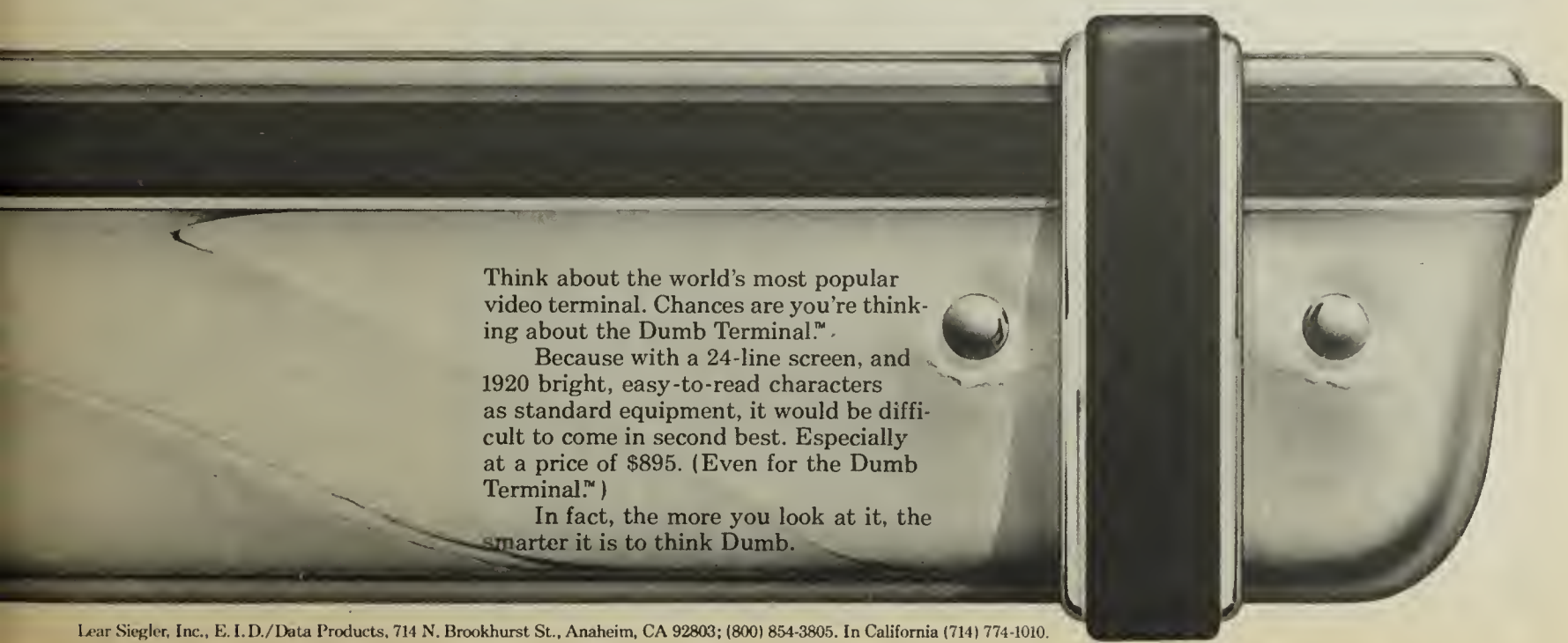

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Wema to Study Drop in Investment Capital

By Edith Holmes
CW Staff

PALO ALTO, Calif. — The dramatic decline in the capital available to start and support the growth of young electronics companies in the U.S. has prompted Wema to form a special task force of industry executives to study and help solve the problem.

Wema, formerly known as the Western Electronics Manufacturers Association, attributed the current lack of investment monies to the continuing increase in the federal and state capital gains taxes over the last eight years. Capital gains taxes have nearly doubled since 1969, stifling any incentive people have to invest their money in businesses — and particularly in small, high technology companies.

These firms require a great deal of capital and their chance of failure is high, according to Edwin V.W. Zschau, chairman of Systems Industries, who will head the task force.

"The situation has become so bad that many would-be companies don't get started and those that do either fail or grow slowly because of capital starvation," Zschau said. "Recently, several have obtained capital from foreign investors, often selling part of their technology in the process," he added.

A 1976 Department of Commerce study underscored the problem, Zschau noted. The study reported that in 1969, when increases in capital gains taxes began to take place, more than 200 young, high technology firms were able to raise $349 million in new invested capital in the U.S.

By 1975, however, the investment climate had deteriorated so much that not a single small, high technology company raised a dollar of new capital in public markets during the first six months of the year, the Commerce study said.

"This is particularly unfortunate since small, high technology firms create jobs at a rate nearly 70 times greater than large, mature companies," Zschau said, adding that "small, fast growing companies have a constant need for infusions of new capital for expansion."

The Wema task force chairman argued that the statistics show that had people in the U.S. been encouraged to invest today at the same rate they did in 1969, the unemployment rate in this country could be more like 3-1/2% rather than 7% or 8%.

Zschau is optimistic that the task force will be able to educate lawmakers with this information, helping them realize "that a vote for increase in capital gains taxes is actually a vote for greater unemployment and inflation."

Wema Opens Eastern Office

PALO ALTO, Calif. — Wema has opened an Eastern U.S. office to provide services to the more than 50 Wema companies in the East.

The new office, located in Amherst, N.H., will be headed by Kenneth J. Ritchie.

"The hiring of a full-time professional and opening of an Eastern office was prompted by Wema's steadily growing membership, which now includes 870 electronics companies in 33 states," Kenneth Oshman, chairman of Wema's board of directors, said.

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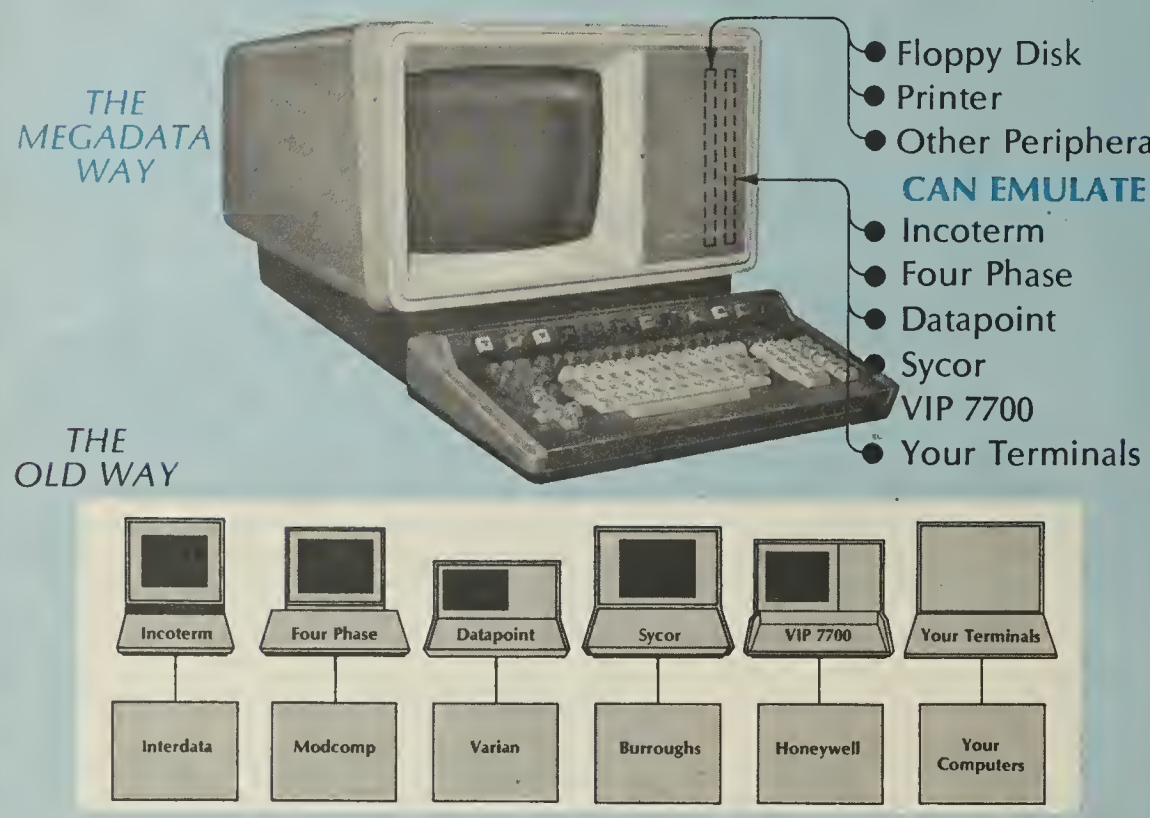

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Expansions

Datacom, Inc. has moved its manufacturing facilities to a 110,000 sq-ft plant on Old Berwick Road, Berwick, Pa.

Monolithic Systems Corp. has added 4,000 sq-ft to its corporate headquarters and production facilities at 14 Inverness Drive East, Englewood, Colo.

Computerland Corp. of San Leandro, Calif., has opened its fourth personal computing retail store in Tustin, Calif.

Digital Equipment Corp. has purchased a building and additional land in order to expand its factory operations at Maynard, Mass.

Analog Devices, Inc. will begin building a larger semiconductor division plant in Wilmington, Mass., this summer.

Computer Power Systems Corp. has moved into larger quarters in Long Beach, Calif.

Hamilton Digital Controls has purchased a building adjacent to its present location on Beachgrove Place, Utica, N.Y.

Microkit, Inc. has moved its general offices and plant to larger quarters at 11205 La Cienega Blvd. in Los Angeles.

Jacquard Systems has moved to larger quarters for manufacturing research and office work. They are located at 1639 Eleventh St., Santa Monica, Calif.

Interstate Electronics Corp. has added a 131,000 sq-ft plant to its Anaheim, Calif. facility.

Computer Sciences Corp. has completed construction of a computer center in Beltsville, Md., to be used in the company's international time-sharing service, Infonet.

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Possible Shortages Predicted in Hobbyist Mart

WOODLAND HILLS, Calif. — Those types of computers that are sold through retail stores may be in short supply during September and October, according to Pertec Computer Corp. (PCC).

"The phenomenon of inexpensive computers, sold in retail outlets for less than $400 in kit form to as much as $15,000 for an assembled small business system, is about to experience its first burst of growth and national attention," according to J. David Callan, divisional vice-president and general manager of PCC's Microsystems Division.

About two weeks ago, PCC announced a series of manufacturing economies and some significant price reductions in its Altair line of micro-based personal computing systems.

"Awareness of this type of equipment is causing a rush to open new stores. PCC, for example, currently sells through more than 50 personal computing retail stores and 30 retail outlets that specialize primarily in very small business systems, and it plans to open 50 to 100 outlets by year end. But we have more than 800 requests for store locations," Callan said.

Just the number of systems necessary to stock new stores may result in a supply-demand imbalance, he explained.

"Further, and most significant, is the lack of comparative data on our customer base. We are assuming that only a minute portion of the market has bought a system at this point.

"With the flood of national publicity and recent articles in *Business Week*, the *Los Angeles Times*, the *New York Times* and other media, a lot of people have suddenly become aware of the types of systems that are available for small business and the things they can do with them. How quickly will this market begin to purchase? That is something we have not been able to project," Callan said.

"Another element that might create shortages in certain geographic areas is also the result of the immaturity of the market," he explained. "In a mature situation, such as the automotive industry, dealers will let each other "borrow" a product. But right now the Altair computer store network is still in a formative stage.

"Stores are located too far from each other to be of more immediate assistance. And, dealers are still learning to balance their own inventories and cashflow," Callan added.

Many of the individuals who operate retail computer stores were hobbyists themselves only a year or so ago. But the store owners are now reaching the point where they can visualize a computer industry that has many parallels with the office equipment business — including its ultimate size, Callan noted.

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Semi Conference To Cover Sales To East Europe

BOSTON — A day-long conference focusing on the market potential for and the problems associated with the sale of semiconductor capital equipment to the USSR and the other socialist countries of Eastern Europe has been scheduled for Sept. 16. at the Colonnade Hotel here.

The conference is designed to present facts and basic information on U.S. export control policies and programs and is being sponsored by the Semiconductor Equipment and Materials Institute (Semi).

A number of ranking government officials are scheduled to participate in the program including recently appointed Deputy Secretary of Commerce Stanley Marcuss; Dr. Maurice Mountain, director of the Office of Strategic Trade and Disclosure in the Department of Defense; Arthur Reichenbach, compliance affairs officer in the Department of State and Joseph Dytrt, director of the Capital Goods and Production Materials Division in the Commerce Department. Roger Majak, staff consultant to the House Subcommittee on International Economic Policy, will analyze the congressional role in export control.

Industry executives participating in the sessions will include Hugh Donaghue, vice-president of Control Data Corp.; Frederick Van Veen, assistant to the president of Teradyne; William Barton, president of International Business Government Counsellors, Inc.; and Aubrey Tobey, director of marketing, GCA.

For further information contact Semi, Suite 212, 625 Ellis St., Mountain View, Calif. 94043.

DP Tools Seen Vital To Emerging Nations

TAMPA, Fla. — Education and training are the essential ingredients for developing countries to obtain long-term benefits from computerization, in the estimation of American Software and Computer Services, Inc. (ASCS).

"Only if computers are made to be tools placed directly in the hands of the developing country's people can meaningful benefits be gained," Peter Fingar of the ASCS staff said.

ASCS plans to channel a major portion of its efforts toward developing nations, Fingar said, as a result of those countries' increased awareness that computers are vital to the orderly process of advancement and industrialization.

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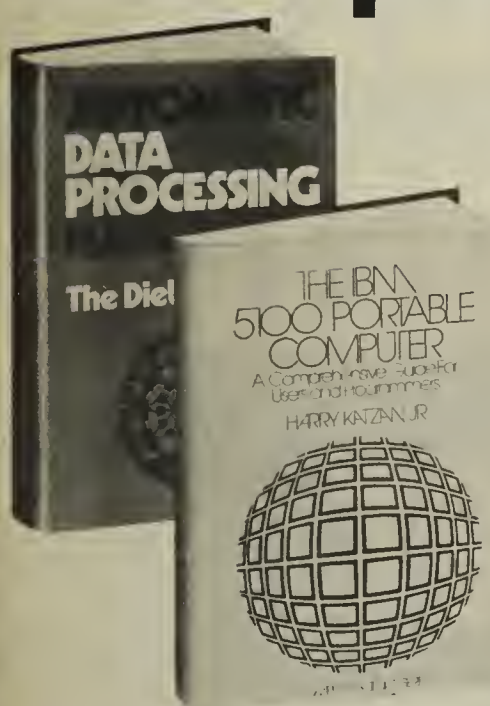

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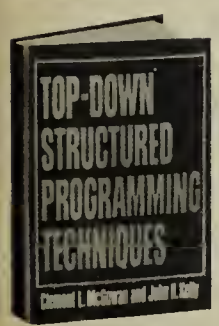

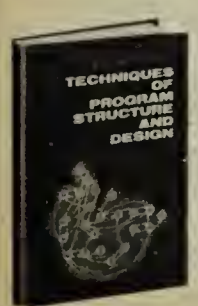

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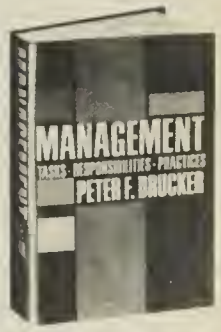

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Two Interchangeable Versions

Intel Designs 'Slaves' for 8-Bit Machines

SANTA CLARA, Calif. — The Microcomputer Division of Intel Corp. has introduced single-chip "slave" microcomputers designed to boost the processing power and control flexibility of 8-bit microprocessors such as the 8080A, 8085 and 8048.

The UPI-41 Universal Peripheral Interface (UPI) components are the first microcomputers with the architecture required to operate as a microprocessor's "intelligent slaves," Intel claimed.

They will be used primarily to interface and control printers, keyboards, displays, cassettes, analog-to-digital converters, serial data communications channels and other peripheral equipment, a spokesman said.

Intel is offering a basic UPI-41 microcomputer in two interchangeable versions, along with an input-output expander for either microcomputer. The Intel customized Model 8041 contains a mask-programmed read-only memory (ROM) for program storage.

The Model 8741 UPI was designed to expedite system development and costs $250 in single quantities. It contains an erasable programmable read-only memory (Eprom) in place of the 8041's ROM. Each 8243 I/O expander unit contains 16 I/O lines and costs $8.

The UPI-41s can store entire control algorithms that would normally consume much of the master processor's execution time and main memory space and execute them in parallel with the main program, Intel said.

Microcosm

In addition to interfacing and control functions, the UPI-41 slaves can also handle data buffering and local DP tasks such as totalizing printed lists, linearizing analog inputs, concentrating data and executing diagnostic routines, the spokesman noted.

With slaves in the system, the 8080A and 8048 single-chip microcomputer or other master can issue commands, transfer data at its convenience and continue executing its main programs, the firm added.

Software development will be simplified since control and overhead routines ordinarily interlaced with main programs can be isolated to UPI-41 modules, according to Intel.

Unlike previous intelligent peripheral chips, the UPI-41 components are fully user-programmable instead of being software-adaptable to particular kinds of applications, Intel said.

Each single-chip slave contains a complete microprocessor to communicate asynchronously with multiple slaves, the firm said from 3065 Bowers Ave., Santa Clara, Calif. 95051.

Analyzer Debuts

SCOTTSDALE, Ariz. — Yucca International, Inc.'s Yuccalyzer Model YA-20 is a real-time, noninterfering microprocessor logic analyzer that costs $875.

The YA-20 is structured to debug systems using 8-bit data bus structures such as the Motorola 6800 and Intel 8080-type micros.

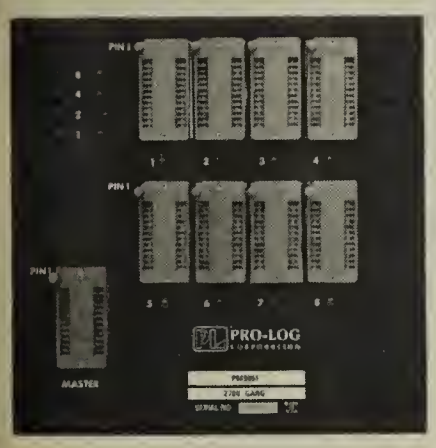
Up to 128 30-bit data words can be trapped and stored at any address in the program, Yucca said. Instructions can be read a data word at a time on hexadecimal LED displays; user inputs and MPU status are reported by LED indicators.

Probes are provided for either the 6800 or 8080 at no cost; others are available on order.

Yucca International is at 14415 N. Scottsdale Road, Scottsdale, Ariz. 85260.

Pro-Log Has Unit For 2708 Types

MONTEREY, Calif. — Pro-Log Corp. is offering a gang personality module it said is able to program up to eight 2708-type 8K MOS erasable programmable read-only memories



PM 9051 Gang Module

(Eprom) simultaneously in less than three minutes.

The PM 9051 can program, duplicate, list and verify 2708-type Eproms from Advanced Micro Devices, Electronic Arrays, Intel, Intersil, Motorola, National Semiconductor, Signetics and Texas Instruments, according to Pro-Log.

The PM 9051 gang module works with both Pro-Log's Series 90 programmable read-only memory (Prom) Programmer and Series 92 Prom programmer/duplicator control units.

With the PM 9051 priced at $895, users can do gang programming with a Series 90 for $2,695 and gang duplicating with a Series 92 for $1,890, Pro-Log said.

The PM 9051 modules are available off-the-shelf from the firm at 2411 Garden Road, Monterey, Calif. 93940.

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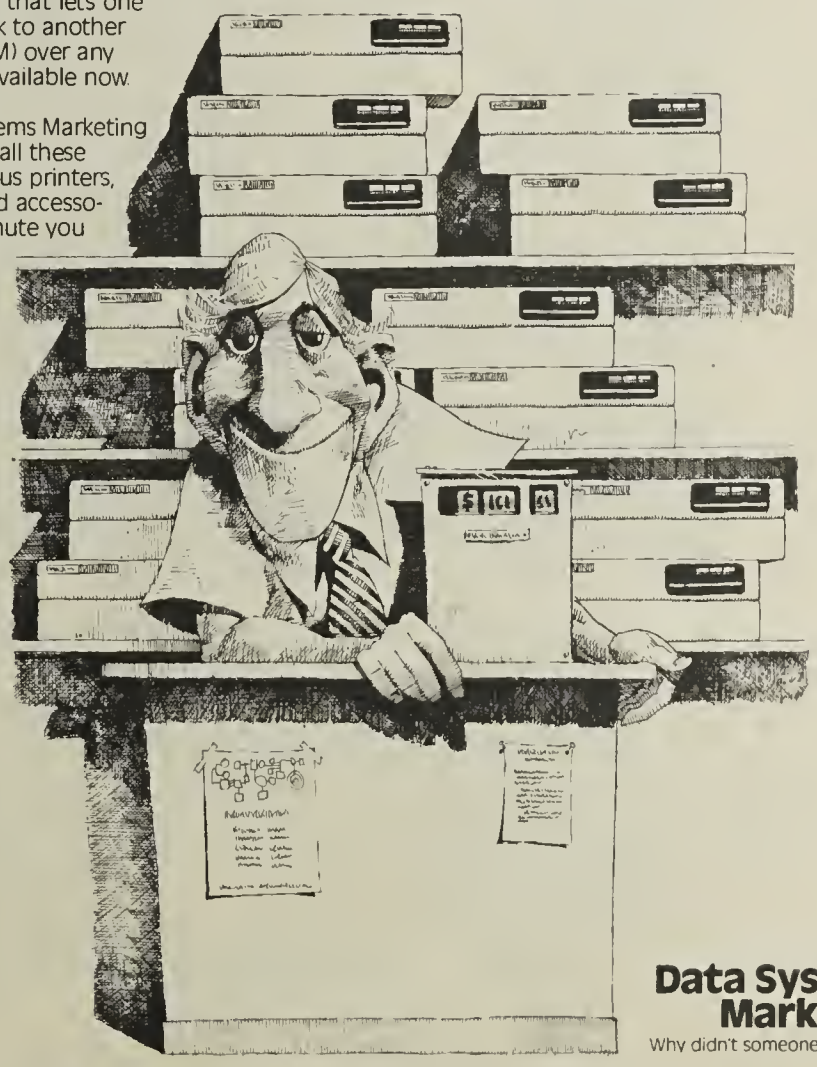

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Fujitsu Unveils Two Disk Drives

SANTA CLARA, Calif. — Fujitsu America, Inc. has unveiled two disk drives, the M2201 with a dual-disk removable cartridge and the M2251, which features Winchester technology.

Prices for the M2201 are $3,900 in quantities of 100 and $215 for the cartridge. The M2251 in capacities of 12.5M- to 50M bytes costs $2,650 to $3,540 in quantities of 100. Deliveries are scheduled for early 1978.

The drives can be intermixed under the same controller, Fujitsu said.

The M2201 is a front-loading drive with two disks within the removable cartridge which contain up to 50M bytes unformatted and 40M bytes formatted.

The removable disk contains four times as much data as other single-disk methods and requires no nonremovable media, the firm claimed.

Access times are 6 msec track-to-track and 30 msec average for the M2201, Fujitsu said. The M2201 uses a track following servo system.

The M2251's access times are 10 msec track-to-track and 40 msec average, the firm said from 2945 Oakmead Village Court, Santa Clara, Calif. 95051.

OEM Products

Raycorder Introduced

MIDDLETOWN, Conn. — Raymond Engineering, Inc.'s Raycorder Model 6413 was designed for use with 1/4-in. data cartridges.

The unit is fully Ansi-Ecma-compatible; modular packaging provides a variety of configurations for OEM requirements, the firm said.

Standard electronics provide automatic search to load point on command and external program capability for drive select codes when up to four drives are operated from a single controller, according to a spokesman.

Data format is serial NRZ at 48 kbit/sec. Block detection allows block count/search operation.

In single quantities, the unit costs $1,250 with a serial interface and $1,400 with a parallel interface from 217 Smith St., Middletown, Conn. 06457.

Printer Gets Controller

SHELTON, Conn. — Practical Automation, Inc. has added an integral microprocessor controller to its 80- to 96-column text/data printer, which prints on adding machine rolls, impact-sensitive paper or fanfold forms and labels, the firm said.

The DMPT-6 printer controller provides selectable interface functions; parallel Ascii, RS-232-1-Loop and switchable transmission rates from 110- to 1,200 bit/sec.

All needle drivers, character generation and required diagnostic routines are also provided by the microprocessor controller, it added.

The needle printer forms 7 by 5 dot matrix characters over the Ascii 63-character set. Printing speeds range up to 110 char./sec and the price is $472 in single quantities.

Practical Automation is at Trap Falls Road, Shelton, Conn. 06484.

40-Pin Controller Out

PALO ALTO, Calif. — Cybernetic Micro Systems has introduced a 40-pin LSI universal printer controller, the Model CY 480, which it said will control and interface any standard 5 by 7 dot matrix printer having a print speed up to 200 char./sec.

The controller operates from a single +5V power supply, according to a spokesman. It will interface a printer with any microcomputer or minicomputer system through standard 8-bit ports and accept either RS-232C or parallel Ascii input from the host system's data channel, he said.

Features include a 5 by 7 dot matrix character generator a full upper/lower case Ascii 96-character and font.

In lots of one to 49, the CY 480 is priced at $92. In quantities of 5,000 and up, it costs $30 from 2460 Embarcadero Way, Palo Alto, Calif. 94303.

Inforex 1300 and 1301 offer highly cost effective data entry capability for smaller installations (4 to 8 keystations) or remote locations where you can take advantage of our communications capabilities.

The 1303 provides medium range data entry capacity, with about triple the disc capacity of the 1301. It supports up to 16 keystations and the addition of edits, table look-ups, range checks and cross-footing. The 1303 also offers communications capabilities such as *spooling, HASP* and *RJE*.

With the 1330, you can consolidate remote job entry and batch data entry applications without compromising either function. The system features expandable disc storage (up to four — 10 Mb. drives) foreground and background editing and bisync communications.

The Inforex 3300 is a powerful pre-processing system that allows you to edit data at the point of entry, enabling you to offload your mainframe. Its sophisticated editing capabilities can also handle many of those applications which you haven't had time to put on your present mainframe.

Univac Integrating MCO

BLUE BELL, Pa. — Univac plans to integrate its new Minicomputer Operations (MCO) into the company organization with a program designed to give "optimum continuity in the acquired operation as well as focus attention on this fast-growth sector of the computer industry."

Univac recently acquired Varian Data Systems. Manufacturing and development of additional hardware and software products will continue to be centered in Irvine, Calif., according to Jerome J. Meyer, vice-president and general manager of Univac MCO.

Meyer noted that expanded development, marketing, production and support plans are being implemented to serve both the traditional mini applications and Univac distributed DP applications.

Meyer pointed out that the development of the MCO product bases — in particular the Series V77 — will be especially directed toward industry sectors with applications in small to large system environments.

T-Bar Head Warns

Communications in Danger

NEW YORK — "The rapid expansion of data communications offers many pontential benefits for our society and almost as many serious problems. In fact, one senses the similarities betwen the present energy crisis and the coming communications crisis," A. Henry Morgan, president of T-Bar, Inc. recently told members of the New York Society of Security Analysts.

"Unfortunately, whereas some people recognized the onset of the current energy crisis as long as 20 years ago," Morgan said, "an awareness of an imminent communications crisis is only seven or eight years old."

In many ways, sustaining uninterrupted data communications has become as vital as sustaining the availability of electrical energy. In one way, it is even more critical, for in data communications "the content of the transfer has its own importance, unlike the substance transferred in an electrical energy system," he noted.

The importance of this data is society's ever-increasing dependence on the computer that provides the services which have become virtual necessities for business and individuals, Morgan said.

Without uninterrupted data communications and data processing, "we would not have available to us the facilities that help us to control disease, disseminate aids, increase agricultural productivity, help control floods or to make provision for world wide credit cards, instantaneous hotel, airline and car reservations or the ready transfer of funds through banks, stock exchanges or other financial institutions," he said.

"Future developments in communications, made possible by increased use of newer technolgies, are expected to even transform the way Americans conduct their lives, at the same time perhaps raising serious problems.

"These transformations will effect how they send and receive messages, pay their bills, talk to their politicians, get their pay, obtain medical care and receive entertainment, news and even their education.

"There is, as well, the possibility of invasion of privacy should the federal government opt for a single clearinghouse for financial transactions. And consider the government's increasing reliance on these technologies for making evaluations that affect defense, taxes, welfare, aid to cities — virtually every area of our lives," Morgan pointed out.

Orders & Installations

Utah County has installed a Burroughs B1726 system and an on-line terminal network of TU 1700 terminals and TD 830 systems in the county building in Provo, Utah.

J.E. Sirrine, engineers and architects, has ordered a Honeywell Model 66/05 large-scale system valued at $800,000.

The Southeast Banking Corp., Miami has ordered a network for credit card and check cashing authorization services from National Data Corp.

The State Bank of Apopka, Fla. has installed an on-line inquiry system from Florida Software Services.

The Revenue Department of the Commonwealth of Pennsylvania has ordered eight Key-Edit 1000 systems, including 190 data terminals, from Consolidated Computer International, Inc.

Lotspeich Co., a Miami-based construction and building supply company, has installed a Geigel & Williams Systems, Inc. turnkey system, including an on-line distribution inventory system.

The Computer Co. of Richmond, Va., has installed a 1.5M-byte 370/Stor 155 add-on memory system from Cambridge Memories,Inc.

The Sumitomo Bank of California has ordered 100 NCR Corp. 279 financial teller terminals for use in the bank's on-line financial system network.

The Wells Fargo Bank of San Francisco has ordered Incoterm Corp. Series 7700 automated teller machines, supporting equipment and software.

The Commodities Exchange Center of New York has installed Trans-Lux Corp. ticker terminals as hard-copy, last-sale tickers for its news and quotation reporting system.

Clay Bernard Systems International of Tulsa has ordered three systems from Tandem Computers, Inc. for distributive process control applications.

Dallas County Community College District has installed the first of 147 APL CRT terminals from Hewlett-Packard.

The National Bank of South Carolina, headquartered in Sumter, has ordered a NCR Corp. Criterion 8550 system and on-line teller terminals.

Demand Data, Inc. a Lakeland, Fla., DP firm has ordered a Data General Corp. C-330 Eclipse System.

Pepperdine University of Malibu, Calif., has installed a Univac 90/60 to process all administrative and academic DP applications for the university.

Rite-Aid Corp., a national retail drug chain, has ordered 600 electronic cash registers worth approximately $1 million from Data Terminal System, Inc.

National Airlines, Inc. of Miami has ordered a Dual CC-80 programmable front-end processor system from Computer Communications, Inc.

Adams Millis Corp. of High Point, N.C., has ordered a System 7000 from Inforex, Inc. to handle its inventory requirements. Adams Millis is a producer of hosiery products.

St. Joseph's Hospital of Parkersburg, W. Va., has ordered a NCR Corp. Medical Information and Communications System.

Hofstra University, Hempstead, N.Y., has installed a Univac 90/60 system, replacing its Univac 70/7 system.

The *Morning News* of Dallas has ordered a Digital Equipment Corp. TMS-11 text management system to be used in the newsroom for automatic capture of wire copy, remote bureau input and local newswriting and editing.

Boston College has ordered a Digital Equipment Corp. PDP-11/70 system to support academic and research programs.

United Feature Syndicate, Inc. of New York has ordered a minimum of 2,500 microcomputer systems from EDC Corp.

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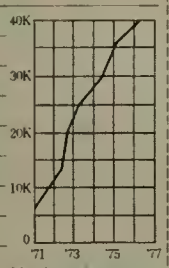

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'New' Company Has Advantage: Experience

ESCONDIDO, Calif. — There's a "new" company here that has an unusual advantage over the typical start-up firm: it has been building its product, a computer data terminal, for half a dozen years.

In fact, the company has shipped more than 1,000 terminals. To the outside world, however, the identity of Design 100 Corp. has been obscured by the fact the company was a captive manufacturing facility for other firms who sold the product under their own names.

More recently, Design 100 has been "reborn" with a new family of terminals that incorporate advanced technology in microelectronics, printing mechanisms, software and packaging. With a highly competitive product and an infusion of private capital, the company is now plunging into marketing and sales, with primary focus on distributors who sell to managers of computer communications and word processing systems.

"Our approach is exceptionally simple," according to Carl Anderson, president of Design 100 Corp. "We will emphasize the strengths of our products to sophisticated customers that understand the advantages of our Cleantype terminals."

In naming the new product line Cleantype, the company is emphasizing one of its features — an easy-to-read, high-quality printout, he said.

"This is a long-standing sore point with computer users who might spend a million dollars or more for a computer system that produces copy which is difficult to ready by any than a practiced eye," Anderson explained.

Design 100 products incorporate the bidirectional daisywheel printer mechanism manufactured by Qume Corp.

The quality of printing is but one competitive feature, according to David Crellen, vice-president of engineering.

"We will be selling versatility in today's multiuse business environment," he said. "All products in the Cleantype series are desktop communications consoles (up to 1,200 bit/sec), with programmable microprocessor, choice of communication codes, interchangeable type fonts, selectable pitch, plotting capability (5,760 points per square inch) and a 256-character print buffer."

A Cleantype terminal can be used for local data entry and editing, as an interactive terminal, as an electronic typewriter in word processing systems and as a plotter for producing graphic exhibits. Design 100 will also offer custom software development services for customers with nonstandard application requirements, he said.

At present, three standard models are being produced, Crellen noted, with differences based on print speeds and type of printer wheel. The Cleantype 45 has a 96-character plastic wheel that prints at 45 char./sec, the Model 55 has the same wheel, but prints at 55 char./sec and the Model 40X features an 88-character metal wheel that prints at 40 char./sec.

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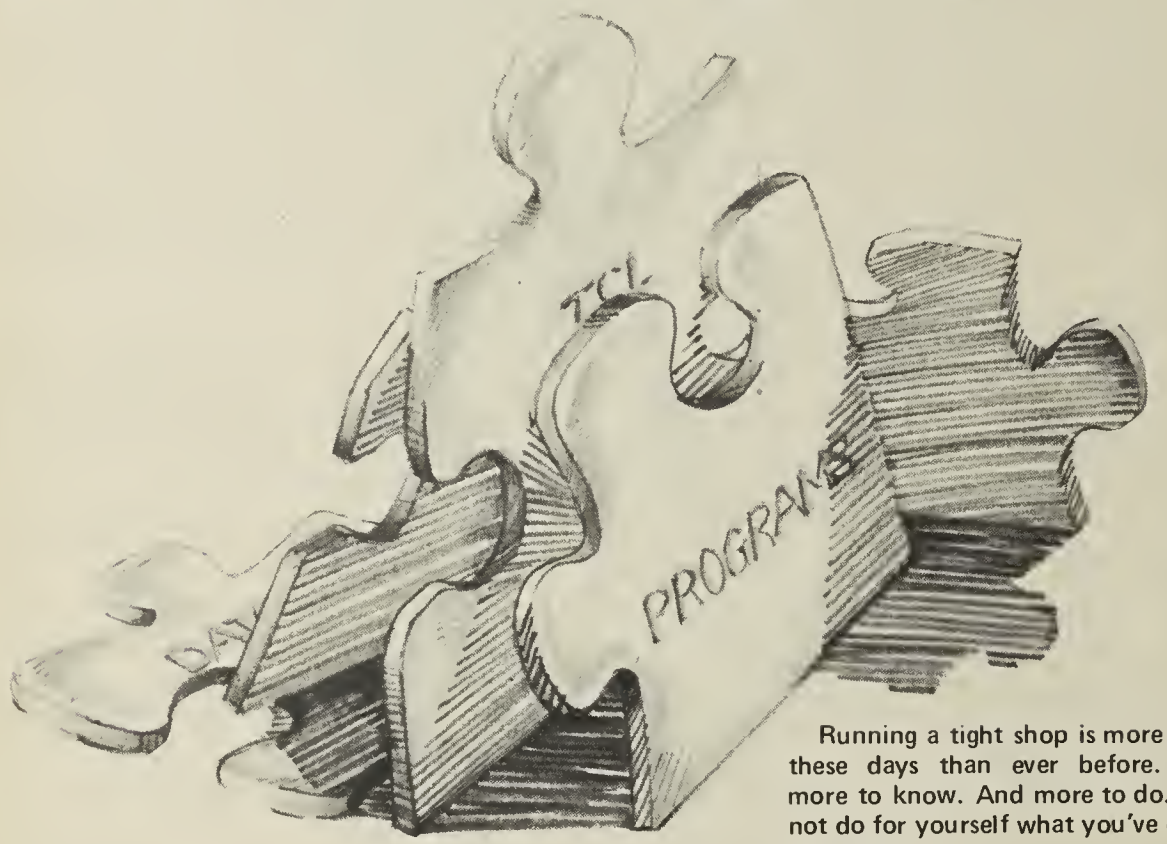

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Merrill Lynch, NCSS Offering Business Service

NEW YORK — Merrill Lynch Economics, Inc. and National CSS, Inc. (NCSS) have announced the availability of economic forecasting and modeling services — a joint effort based upon the Merrill Lynch Economics Macro-Econometric Model and implemented through NCSS' computer services.

"We have been working for a long time to develop a large-scale econometric model of the U.S. that was detailed enough — at the industry level — to provide our clients with a practical analytical tool," according to Dr. Albert H. Cox Jr., chief economist and president of Merrill Lynch Economics.

"Today we have such a model," Cox continued, "a practical tool, tied to the activity in 81 different industries, for forecasting the national economy and its sectors. An example is the automobile component of final demand which is built up from a detailed 80-equation model of the automobile industry."

At a joint news conference, Robert E. Weissman, NCSS president, added, "It's our job to make this important new approach to business forecasting information available in the right places, at the right time. To do this, National CSS provides data communications designed to accept and deliver forecasting information at any location.

"We also supply the applications software to translate the data and deliver solutions in a form that makes business sense. And we provide the computers which deliver the power to drive the entire system."

The core of the Macro-Econometric Model's real sector comprises 53 indexes of industrial production. The model generates forecasts of employee compensation in 11 business and government categories.

In the pricing sector, nearly 50 wholesale price indexes are modeled. These, in turn, become the cost base for nearly 30 consumer price indexes.

According to Cox and Weissman, the industry detail of this econometric forecasting system signals a major step forward in the provision of information for businesses across the country.

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Meet your Source Edp Atlantic Coast Conference Directors.

Richard E. Gardner is Director of the Boston office. Rich, who holds a B.S. degree in Mechanical Engineering from Newark College of Engineering, has been in the computer field since 1968. Prior to joining Source Edp, he was associated with IBM for eight years in a variety of marketing and account management positions.

Martin Grolnic is Director of the Washington, D.C. office. Marty, who holds a B.S. degree from Temple University, has been involved in computing since 1959. Prior to joining Source Edp, he was District Manager for ASI, Marketing Director for Digidata Inc. and Regional Manager for Leasco Response, Inc. Earlier experience includes six years with RCA Corporation in systems development, systems management and product planning.

Steven M. Joffe is Director of the Union office. Steve, who holds a B.S. from Queens College and an M.S. in Management Science from Stevens Institute, has been active in data processing since 1965. Prior to joining Source Edp, he was Project Administrator and Senior Staff member with Dun & Bradstreet, Inc. for nearly four years. Earlier positions were Senior Analyst with Joseph E. Seagram & Sons, Senior Programmer with Allied Chemical, Operations Research Analyst with General Foods and Systems Analyst with Prentice-Hall.

Thomas C. Johnston is Director of the Hartford office. Tom, who holds a B.S. degree in Business Administration from Western Michigan University, has been in data processing since 1967. Prior to joining Source Edp, he served as a Marketing Account Manager for Honeywell Information Systems and Systems Analyst and Sales Representative for Sperry Univac.

Daniel S. Mickel is Director of the Stamford office. Dan, who holds a B.A. degree from the University of Rochester, has been associated with computing since 1957. Prior to joining Source Edp, he served as Director of MIS for the City of New York. Earlier, he was associated with Mutual of New York in various positions including Assistant Director of Data Processing, Director of Electronics, and Systems Associate.

William R. Penberthy is Director of the Philadelphia office. Bill, who majored in Electrical Engineering, has been associated with data processing since 1957. Prior to joining Source Edp, he was involved in his own computer consulting firm for nearly two years. Earlier positions included Data Processing Manager for the city of Flint, Michigan and Montgomery Ward. He also worked as a Systems Engineer for NCR and IBM.

Michael D. Taylor is Director of the Atlanta office. Mike, who holds B.S.E.E. and M.S.E.E. degrees from the University of Texas, has been involved in computing and electronics since 1968. Prior to joining Source Edp, he was employed as a Systems Engineer for Electronic Data Systems for nearly two years. Earlier experience was as a Development Engineer with Schlumberger Well Services and with Radiation Incorporated.

Gary L. Weiss is Director of the Wellesley office. Gary, who holds a B.S. degree in Marketing from the University of Arizona, has been involved in the computing field since 1968. Prior to joining Source Edp, Gary was Boston Branch Manager for Periphonics. His initial experience was gained at IBM for six years as an Account Representative and National Account Team Leader.

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If you're a senior-level software engineer experienced in software development for microprocessor applications or tools, Digital has many exciting positions at all levels of responsibility currently available. These positions offer highly visible, challenging opportunities for growth in Digital's dynamic environment and vary in degree of responsibility from programmer to senior technical consultant.

They include tasks such as:

- designing and developing microprocessor firmware
- developing and supporting software tools for microprocessors such as assemblers, compilers and debugging utilities
- providing expert microprocessor software consulting services for engineering groups in Digital
- developing and promoting standards and guidelines for microprocessor software and its systematic development

If you are interested in the above positions and have a BS in CS or EE, or equivalent experience, at least 1-2 years direct work or school laboratory experience in the development of software for microprocessors, and can exchange ideas effectively with hardware engineers, we would like to hear from you. Naturally, with additional years of experience in programming or engineering you will qualify for more senior positions.

Please forward your resume outlining salary requirements to Joe Hart, Digital Equipment Corporation, Dept. B912, 162 Main Street, Maynard, Massachusetts 01754.

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The continuing expansion of our Data Processing department has created several new openings for experienced programmer/analysts. Come join our team of professionals where you can use and expand on your expertise.

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(312) 531-3242

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SOFTWARE SYSTEMS POSITIONS

Multi billion dollar Mid Atlantic bank is seeking Data Processing professional for its rapidly expanding Data Processing Division. You will join the movement toward a large scale on-line system integrated into a total data base with the accent on state-of-the-art equipment and systems

MANAGER SOFTWARE SYSTEM DEPARTMENT

The successful candidate will have responsibility for the planning and maintenance of operating systems for a multiple CPU environment including an IBM 370/158 and an AMDAHL 470/V5. At least 2 years of software systems managerial experience necessary with virtual systems experience essential

TELECOMMUNICATIONS ANALYST

The individual will be responsible for installing and maintaining communications networks and the coordination with carriers, equipment vendors and user departments, software analysts, and computer operations for installation and network maintenance.

Even if you are satisfied with your present position, we encourage you to spend a few minutes with us and review our exciting plans for the future. These positions provide an excellent salary and benefits package. Please submit a resume or brief letter of inquiry to

CW Box 3160
797 Washington St.
Newton, Mass. 02160
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Programmers

(Southern California)

Northrop Data Processing Center in Hawthorne, California, has openings for qualified programmers in the following areas:

Applications Programmers

Will write new COBOL programs for development projects and modify programs for ongoing batch and IMS Data Base Systems, including coding of PSB, DBD, and MFS control blocks. Support application in material, manufacturing and financial function. 4 year degree plus 2-5 years' experience in COBOL with emphasis in analysis, programming and documentation.

Systems Programmers-IMS

Duties to include IMS sysgens control block generations and maintenance and use of IMS related utility programs. Must have degree and at least 2 years' experience in the IMS support area.

Senior Financial Analysts

Will develop, coordinate and issue foresight procedures and documentation standards as well as plan, develop and coordinate foresight user meetings. Requires 3 years' financial, general ledger and cost accounting experience, plus a degree in Business Administration or Accounting. Strong user oriented background essential as this position is the nucleus of dissemination of foresight technical user information.

Please send resume to:

Technical Employment Office
3901 West Broadway
Hawthorne, California 90250

NORTHROP

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Data Processing Professionals

Opportunities with Levi Strauss & Co. in San Francisco

The Corporate offices of Levi Strauss & Co., a world leader in the apparel industry, is seeking Data Processing Professionals interested in careers within our Data Processing Group.

Programmer/Analysts

Responsibilities include systems analysis and programming, user interface and systems enhancements in commercial applications. Requires 2-3 years of programming experience including 1 year of ALC and/or 2 years of COBOL plus working knowledge of 370 OS, JCL and Utilities.
Previous experience with sales/marketing, manufacturing and/or financial applications, TSO and PANVALET desirable.

Systems Programmers

Responsibilities include systems generation and maintenance of OS/VS2, IMS, HASP, software and hardware consulting and implementation planning; assist programmers in developing installation standards, tuning systems, and procuring software packages.
Seeking 2-3 years systems programming experience in OS/VS2, IMS HASP, and JCL.
Successful candidates will enjoy a professional environment, competitive salaries, excellent benefits and working conditions.
If you are interested and meet the above qualifications, please forward your resume and salary requirements to: Professional Employment Department, PM-5, Two Embarcadero Center, San Francisco, CA 94106. We are proud to be an equal opportunity employer.

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Senior Software Development Engineer

Will program software implementable functions on dedicated instrument devices. These devices typically require programming of a commercial microprocessor. Programs may reside in either ROM or RAM. This person to be involved from conceptual system design through to a finished product. Requires at least 4 years' experience programming small computer systems (micro experience helpful).

Senior Software Design Engineer

Will be responsible for supervision of programmers engaged in the design and implementation of software for microprocessor based control products. Will participate in project definition, feasibility studies, design reviews. Requires at least 5 years' mini and micro programming experience with real time control systems.

Senior Software Design Engineer

Key person responsible for the design and implementation of software for a microprocessor based digital control system. Will participate in project definition, feasibility studies, design reviews, trade-off studies, etc. Most programming done in assembly language. Degree with at least 3 years' experience required.

Senior Software Design Engineer

Will be project programmer for general purpose microprocessor based man-machine interface. Will participate in evaluation of functions, integration with other products, and will do detailed design and implementation of MMI Firmware programs. Degree with at least 3 years' experience required.

Scientific Programmer

You will assist the Systems engineer in the estimation, design and implementation of application software and work as project programmer on applied systems. BS in Engineering, the sciences or equivalent and at least 2 years' experience in real time application programming with Fortran experience required.

Simulation Software Engineer

Will be responsible for simulation involving one or more of the following areas: computer system simulation, continuous simulation of process control systems, discrete simulation of manufacturing processes.

Degree required and at least 1 year simulation and analysis of complex systems experience. Familiarity with GPSS or one or more of the major simulation languages and CSMP and FORTRAN programming experience. Knowledge of process control theory desirable.

Please send resume, including salary history, to Mike Boyd, Dept. 129-CW, The Foxboro Company, 38 Neponset Avenue, Foxboro, MA 02035. Foxboro is an equal opportunity employer, M/F.

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EUROPE
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HOWARD ORGANIZATION INTERNATIONAL LTD., a leading European E.D.P. SERVICE ORGANIZATION, has immediate openings for senior systems designers with specialist experience in real-time communications (ideally in packet switching).

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By European standards incomes will be very attractive including overseas allowances. Our preference is for designer with E.E.C. passport status and interviews will take place during September.

Please send your resume and income expectations to:
E. Ryan, Overseas Recruitment Consultant

HOWARD ORGANIZATION INTERNATIONAL LTD.
Employment Business Section
Manor Way, Borehamwood
Hertfordshire, WD6 1LE England

SYSTEMS PROGRAMMERS

Technical Services at Indiana University/Purdue University at Indianapolis has challenging career opportunities at all levels for systems programmers with experience on DEC-10's and/or 370's.

IBM 370 SYSTEMS PROGRAMMERS

Positions exist in two areas:

Operating and Telecommunications Systems — B.S. and at least one year experience with TOPS-10. Knowledge of operating system internals a must. Familiarity with performance measurement and schedulers highly desirable.

Systems Software — B.S. and at least one year experience with editors, loaders, compilers, and other systems programs. This position will also support similar requirements on a CDC 6600 and Cyber 172.

DEC-10 SYSTEMS PROGRAMMERS

A challenging position as lead systems programmer is open to the right individual with at least two years' experience with 360 or 370 operating systems, at least one year of which must be in DOS/VS or OS/VS. This individual will have full responsibility for operating system software on a 360/44 running DOS and on a 370/125. The 370/125 will be used for academic instruction in operating system theory and construction and will run DOS/VS, OS/VS1, and VM. It will also act as an RJE station to the DEC 1090 and a 370/158 running MVS. This position thus offers considerable opportunity for growth and technical challenge.

IUPUI has a student enrollment of 22,000 and combines the strengths of the curricula of two BIG TEN SCHOOLS and the largest school of medicine in the country. Computer equipment on campus supported by Technical Services includes IBM 360/44 and 370/125 systems and a DEC 1090. In addition, the group provides support and has access to a 370/158, CDC 6600, and CYBER 172 at our Bloomington campus, as well as a large number of minis in use for research at Indianapolis.

Fringe benefits are excellent. Salary is commensurate with experience.

Please submit resume to: Bill Schilk, Personnel Division, Indiana University/Purdue University at Indianapolis, 1100 W. Michigan St., Indianapolis, IN 46202, An Equal Opportunity Employer.

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Challenging positions for field engineers with a minimum of three years experience with mini-computer based data entry and dispersed processing systems. Applicants should have experience with check processing systems and/or optical scanning devices. Salary commensurate with experience.

SOFTWARE TECHNICAL WRITER

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Preparation of user's software manuals and bulletins. Experience in EDP software technical writing required. Salary commensurate with experience.

TRAINING for all positions provided at our home office in suburban Chicago.

Send resume with full salary history to Ann Kane.

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For immediate consideration forward your detailed resume in confidence to M.D. Westhoff, TEKTRONIX, INC., 3200 Coronado Drive, Santa Clara, CA 95051. Or call the above toll free number and leave the requested information with one of our special operators and we will get back to you very soon. An equal opportunity employer M/F/H.

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The Minerals Department of Exxon Company, U.S.A. has openings for Systems Analysts with expertise in computer applications in mining with the following qualifications:

- Degree in mining engineering or geology preferred
- Minimum of three years experience
- Proficiency in Fortran or PL/I necessary
- Knowledge of JCL, OS/MVS, and TSO desirable
- Background in ore modeling, geostatistics and/or operations research is a plus

Excellent benefits package and opportunity for advancement.

Reply to:
Recruitment Coordinator
Exxon Company, U.S.A.
Minerals Department
Room 1357J Dresser Tower
P. O. Box 2180
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(609) 667-4488

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(215) 629-0595

RSVP SERVICES
Employment Agency for Computer Professionals

OPPORTUNITIES
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SYSTEMS PROGRAMMER

We are seeking Systems Programmers with TP background to work in a rapidly growing TP environment. We are a 370-168/158 MVS shop with CICS, TSO and TCAM applications.

ANALYST PROGRAMMERS

Do you consider yourself a thorough professional in any of the following:

System design and architecture, leader of large system programming teams, programmer in large scale 370 MVS environment? Do you accept the concepts of hard specifications, deadlines, and tight cost controls? You may find our environment challenging (PL/1 is our language).

Please submit an up-to-date resume including salary requirements to:

Mrs. Linda Heidenis
NORTHEAST UTILITIES
P.O. BOX 270, HARTFORD, CONNECTICUT 06101

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SR. ANALYSTS
PROGRAMMER ANALYSTS

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PROGRAMMER ANALYSTS

Bethesda, Maryland

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or send resume and salary history

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BSEE with minimum 4 to 6 years' experience or equivelent in development of hardware systems using micro computers on discrete controllers. Experience in ereas such as disc controllers or other mass storage system controllers is preferable.

SENIOR DESIGN ENGINEER - FIRMWARE
BSEE or BS in Computer Science with 2 to 3 yeers' experience in software development of real time mini-micro computer systems. Experience with I/O drivers for devices such as cassettes, megnetic tepes, floppy disks or disks is prefereble.

FIRMWARE ENGINEER - DIAGNOSTICS
Minimum 2 years' experience in herdwere design, programming in assembly language of micro computers. Diagnostics programming e definite plus. BSEE or equivalent desired.

SENIOR ENGINEER - ANALOG
BSEE a must, MSEE desirable. Five years' experience in enalog circuit design, preferebly in magnetic recording and/or servo mechanisms.

SENIOR MECHANICAL ENGINEER
A BSME is reouired, MSME highly desireble, plus at least 7 years' experience in the design of products involving small, high reliability mechanisms, preferably in the printer field or related to computer peripherals. Your background should include leadership responsibility on development projects.

INDUSTRIAL ENGINEER
Minimum 2 yeers' experience with printed circuit board assembly methods a must, electro-mechanical assembly experience a definite plus; should be experienced in processing and standerds. A degree in E.E. or eouivelent experience is needed.

SYSTEMS ENGINEER
Experience es a Progremmer in COBOL or Assembler required. Micro/Mini end/or programmable (intelligent) terminal use or support experience desirable, plus exposure to data entry applicetions end marketing customer support. Communications with bi-sync end on-line background especially helpful. Bachelor's degree desired.

SALES REPRESENTATIVE
Minimum of 3 years' experience successfully selling terminels, peripherals, or smell systems and general knowledge of DP applications, including communications is required. Cendidetes must have a proven track record of sales performance over quota. Responsibilities include sales of a complete line of computer products and support of existing customers.

USER LANGUAGE DEVELOPMENT
Participate in the development of COBOL/BASIC/RPG II compilers and associated interpreters for Sycor 400 series equipment. Responsibilities include language development, design and implementation. B.S. or M.S. in Computer Science or related field with relevant course work and/or experience. Knowledge of block structured language and one of COBOL/BASIC/RPG II. Machine level programming, especially 8080 or other microprocessor would be a plus.

SYSTEMS LANGUAGE DEVELOPMENT
Participate in development of Sycor's systems implementation language, SYCLOPS. Responsibilities include language development, compiler development, code generation for new microprocessors and application of source optimization techniques. B.S. or M.S. in Computer Science or related field with relevant course work and/or experience. Knowledge of block structured language and machine level programming, preferably for 8080 or other microprocessor is a plus.

DBMS DEVELOPMENT
Participate in the development of a generalized DBMS for Sycor systems, using state of the art technique. B.S. or M.S. in Computer Science or related field with emphasis on data structures and DBMS. Knowledge of a block structured language and machine level programming, preferably for 8080 or other microprocessor is a plus.

If unable to see us during the WESCON show interviews, please send your resume in confidence to:

Gopi R. Jindal, Ph.D., Manager Corporate Employment & Staffing, 100 Phoenix Drive, Ann Arbor, Mich. 48104 (313) 995-1156.

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Systems Opportunities

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Experience with Systems for construction project controls is a plus.

Systems Analyst

Systems design at both conceptual and detail level. Function as a project leader in the development of major EDP systems and will interface with all levels of management. 3 to 5 years' experience with large scale systems.

Programmer Analyst

Analyze job requirements, prepare specifications, prepare time and work cost estimates for systems development work. May function as a programmer and participate in programming activities. 2 to 3 years' experience with large scale systems.

Offered with the above are excellent starting salaries, liberal relocation allowance, and benefits program.

For immediate consideration, please send your resume with salary requirements, in confidence, to:

David Bibb
DANIEL INTERNATIONAL
Daniel Building
Greenville, S.C. 29602

DANIEL INTERNATIONAL

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Field Engineering Specialists

Amdahl Corporation has earned an international reputation as builder of the most advanced large computer system. Since our first shipment two years ago, we have delivered a quarter of a billion dollars worth of computers to the world's major companies and institutions. The company is exciting, the environment stimulating, and our compensation and benefits are excellent.

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Requires experience on IBM/370 using COBOL/ALC working with IMS/DL 1 data base systems.

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Computer System Engineer

M.S. or PhD in Electrical Engineering or Computer Science and 5 years' experience in hardware and software design of real-time computer systems.

Communication Network Engineer

Engineering or Scientific degree with 3-5 years' experience in the communication field with emphasis on data communications.

Software System Designer

M.S. in Computer Science or Engineering and 5 years' experience in design of software systems for real-time and interactive systems.

Programmers

B.S. in Computer Science, Math, Physics, Engineering or Business and programming experience with higher order languages such as Fortran, COBOL, PASCAL, or PL/1. Both scientific, business and real-time programmers are needed. Openings for these positions are in Dallas, Texas.

Minicomputer Programmers

Requires experience on 16 bit mini's using Fortran or Assembly languages working on data base management, communications, factory automation, interactive graphics and computer aided design.

Send your resume in confidence to: Staffing Manager/ Equipment Group/P. O. Box 6015, M.S. 222/Dallas, Texas 75222.

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SENIOR SYSTEMS PROGRAMMER

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Experience in the design, analysis and implementation of manufacturing systems. Excellent communication skills with current or previous expertise in COBOL programming using 370 DOS/VS and TOTAL. College desirable.

ANALYST/PROGRAMMERS

Solid experience writing COBOL for 370 systems under DOS/VS. Any experience with data base and manufacturing systems would be very desirable.

Send resume and salary history to:
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Employees will enjoy excellent salary and top working conditions with a commercial employer Fully paid life, hospital and medical plan for employees and dependents, generous relocation allowance.

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NCR DATA PROCESSING DIVISION
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Keane Is:

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For more on Keane, send for our resume, or better yet, send YOUR resume to:

Keane Associates, Inc.
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Keane Keane

DATA PROCESSING PERSONNEL

The J.E. Sirrine Company, recently rated the nation's number one industrial, architectural, and engineering design firm, is developing an

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- **Systems Programmers**
- **Operations Manager**
- **Engineering Analyst/ Programmer**

Our corporate Data Center is located in Greenville, South Carolina with remote sites in Houston, Texas and Raleigh, North Carolina.

Individuals selected will have two to five years experience. Degree preferred.

Send resume, in confidence, to:

Personnel Director

J.E. SIRRINE COMPANY
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Stuart, Florida 33494

COMPUTER ROOM MANAGER

Dynamic 370 on-line computer center in Los Angeles requires Manager who can wear all types of hats. Primary responsibility will be the supervision of the computer room personnel, scheduling of work and interfacing with data entry and user departments. Person must be familiar with all aspects of JCL including DASD and tape label cards. Programming support staff is not located in-house and therefore individual must be familiar with 370 Assembly Language operating under DOS/VS Multi-task so that he can intelligently communicate program problems to the programming staff and obtain the necessary documentation for program debugging. Although disk allocations, file capacities, etc. are defined and implemented by the off-site programming staff, the Computer Room Manager will be responsible for monitoring disk usage by interpreting VTOC listings. Newspaper experience will be considered a definite asset. Please send replies to CW Box 3147, 797 Washington St., Newton, MA 02160.

VERMONT
ANALYST/ PROGRAMMER

Two-three years experience Sys/III Mod-15 RPG II and systems design. Aid in development of new on-line communication system. Please send resume and salary requirements to:

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Green Mountain Power Corp.
1 Main Street
Burlington, VT 05401
Equal Opportunity Employer

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Please notify *Computerworld* at least four weeks in advance. When writing about your subscription, please enclose a recent mailing label. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your records. If you are receiving duplicate copies, please send both labels.

797 Washington Street
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PROGRAMMER ANALYSTS

Expanding Data Processing department of multi-state corporation is seeking aggressive, self-motivated programmer analysts. Persons must have ability to communicate with all levels of users. COBOL & ALGOL necessary, degree an asset. Minimum 1 year prior experience. Salary commensurate with experience, excellent fringes. Please send resume including salary history to:

Personnel Department
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PROGRAMMER/ ANALYST

Washington D.C. Metropolitan area company is seeking qualified applicants for the following positions(s).

PROGRAMMER/ANALYST

Three (3) positions—Applicants must have a minimum of one to three years COBOL Business programming experience. Educational background must include computer science, mathematics, business or related fields. Must be familiar with IBM 370 series. DOS-VS experience and knowledge of CICS helpful. Salary to $23,000, commensurate with experience.

Please send resume stating salary requirements to:

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Cadillac's EDP placement service is without cost to you. Companies pay all fees and expenses. Client firms are located nationwide, and are engaged in all industries — Manufacturing, Banking, Insurance, etc.

Immediate needs include:

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Sr. Anal/Project Mgrs	$20-25K	Mgmt. Science Analysts	$17-24K
Software Prog (2-5 yrs)	$18-23K	Scientific Programmers (mini's, etc.)	$16-23K

We offer assistance in evaluating your present position. Just send your resume and we will call you to discuss your objectives and explain how we might help you reach your goals.

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32 W. Randolph St., Chicago, IL 60601
(312) 346-9400

SOFTWARE SPECIALIST

We have an excellent opportunity for a qualified individual in our IBM 370 Data Center in Houston, Texas.

You will be responsible for the implementation and maintenance of the OS/VSI and VM Operating System, Data Communications Software and for the evaluation and selection of software enhancement and performance measuring packages.

This is a significant position which will allow you to participate in the technical design review for all new applications development. You must be able to provide technical support to the Systems/Programming and Operations Staff.

Required Experience:

OS/VSI	Sys Gen
IBM	Assembler Language
IBM	ANS COBOL Language
IBM	OS/VSI JCL
IBM	Utility Programs

Desired Experience:

VM	Sys Gen
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IMS	DB/DC

For confidential consideration, please forward your resume, including current compensation, to:

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DALLAS

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Make a good living where the living is good. There's no question—living is good in the Dallas area. Our public school systems have earned national recognition for excellence. We're one of the fastest growing areas in the nation, yet our housing dollar still buys considerably more home in Dallas than it would in most other metropolitan areas. We're surrounded by lakes, and blessed by beautiful weather year 'round. We back professional, university, and high school athletic teams, and we support our symphony, theaters, the civic opera and several museums. But, best of all, most of us are down home friendly people.

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If you qualify, send your resume with salary history to:
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E-Systems, Inc.
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Dallas, TX 75222

SOLID STATE TECHNOLOGY RESEARCH PLANNING

A major east coast computer manufacturer is searching for an individual with a Ph.D. and research background in one or more areas of solid state technology, and with several years experience in device and chip design and fabrication of computer related circuits, to fill a key management level staff position in a growing research organization.

Major responsibilities will be to identify research needs in the area of solid-state technology related to commercial mainframe computer systems, and create, initiate and monitor multi-year research programs which will provide new technologies for use in developing future computer systems. Will also help define in-house integrated circuit production needs and facilities requirements.

Candidates for this position will have a solid commitment to the need for well planned, innovative research, and will be ready to assume full responsibility for the planning and monitoring of research in this critical area of computer technology.

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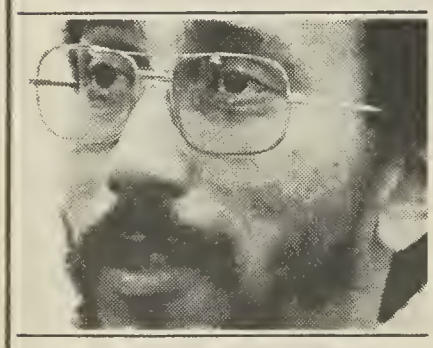
Digital's Field Headquarters Organization was the answer for Peter, Collins, Sue, and Bob...

and it could be the answer for you.



If your career growth isn't progressing as rapidly as you'd expected and you're beginning to find that your projects aren't as exciting as they once were, consider the experiences of Peter, Collins, Sue, and Bob.

They reacted to similar points in their own careers by critically re-evaluating their goals and where they could achieve them. And what Peter, Collins, Sue, and Bob all discovered were the opportunities for growth, advancement, and responsibility, within Digital's Field Headquarters Organization.

Their standards were very high when they searched for a place where they could have a more meaningful, productive, and rewarding career. They chose our Field Headquarters Organization. Like many other talented and ambitious professionals, Peter, Collins, Sue and Bob found our environment encourages initiative, increased responsibility and advancement while working at the vanguard of computer technology.

Corporate Field Service is responsible for all customer support services, giving you a unique opportunity for exploration and involvement across the entire spectrum of our technical operations. You'll have a chance to be right on top of state-of-the-art developments in a variety of hardware/software support areas (Memory, Peripherals, Power Supplies, and Communications) as well as the design, maintenance and installation of small, medium and large scale operating systems.

You can also utilize your communications skills and knowledge of operating systems and compilers. Or you could help develop A/V courses and instruct hardware/software courses for new systems and products. And because your contributions impact on a corporate level, you'll have unusually high visibility within one of the world's leaders in computer development and manufacture.

Our various groups within the Field Headquarters Organization — Product Support, Software Service, Field Service Logistics/Operations Development, Educational Services and Technical Documentation — offer you a wide range of virtually unlimited opportunities.

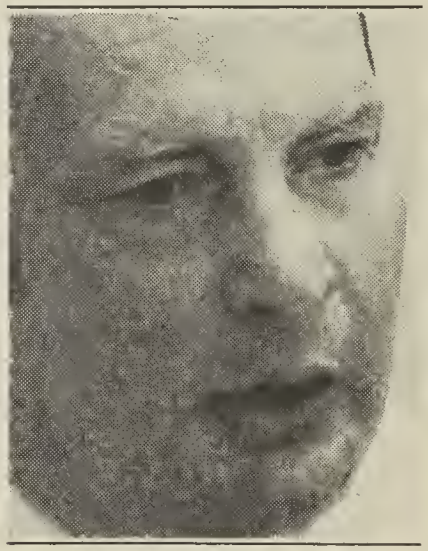
Product Support

Our organization is interested in pursuing exceptional candidates with a strong desire to grow and ability to be creative. We are looking for people with a combination of technical computer background, business skills and some experience in dealing with hardward oriented field related problems. Several positions are currently available for hardware professionals including Project Managers with good technical and business skills and Support Engineers with experience in disc, mag tape, data communications, terminals, etc.

Contact: Jon Zion

Software Service

At Digital, service is a major business. Commitment to providing excellent service makes this a key group. They provide highly qualified technical expertise to back up the Field Software Service Organization in the solution of both product oriented and customer oriented software problems.



You can be a Software Specialist if you have done one of the following: customer or vendor software support, if you are a good Systems Programmer with a solid knowledge of operating systems, compilers or device drivers, have installed, tested or started-up software packages, or if you have distributive processing or networking experience.

If you would like the visibility of a Headquarters position, we can offer you a managerial or technical dual-path career opportunity.

Contact: Dale Welch.

Field Service: Logistics/Operations Development

Responsible for monitoring inventory to over 150 Digital offices throughout the United States and Canada, this group is seeking Clerks and Planners. It is supported by an EDP Business Group, which has several positions available for Programmers, Programmer Analysts with a background in Financial Applications and Principle Systems Analysts with COBOL experience. Exposure to DEC-systems 10 and/or 11 desired.

Contact: Pete Rojcewicz.

Technical Writers

Digital is seeking talented, experienced Technical Writers who can research, organize and communicate. You'll be on a par with Engineers and have the potential to advance to Project Management. If you're experienced in generating technical descriptions and servicing information associated with both processors and peripheral devices, we're looking for you.

Contact: Pete Rojcewicz.

Sales Training

The Sales Training Group is responsible for keeping Digital's sales force informed on new products and new trends in computer sales and the computer business. To provide this service, the group needs qualified Technical Sales Trainers and Program Developers. Our primary needs at this time are for Program Developers who are responsible for putting together course materials for class presentations, as well as Program Developers for self-paced programs on Digital's products and services. Ideally, you will have hardware and software experience and be familiar with course development.

Contact: Bill Mersch.

In-House Field Service

This group is responsible for the installation and maintenance of all computer systems within our Corporate headquarters. We

currently need in-house Technicians and Field Service Engineers to work on state-of-the-art hardware in this high visibility environment.

Contact: Jeff Bull.

Educational Services

Responsible for providing technical training to Digital customers and employees, this group is seeking professionals with a solid technical knowledge and a desire to teach or to become involved in course development work. Opportunities are available in both the hardware and software areas, and a field service, maintenance, or applications programming background would be desirable. If you're looking to broaden your career horizons, the wide exposure, technical challenge, and excellent growth potential of one of the largest training organizations in the computer industry is for you!

Contact: Mary Ann Joyce.

Peter

Educational Services

After he had worked his way up to Project Manager with another company, Peter was ready for new challenges. He came to our Educational Services division as an Instructor and is now Commercial Systems Manager with responsibility for teaching all commercial products developed and assessing the need for educational services. Peter's growth to managerial responsibilities was what he was looking for, and he calls Digital "a dynamic company — very people-oriented with good opportunities."

Collins

Field Service: Logistics/Operations Development

Collins brought his considerable expertise in a wide range of applications areas from another major company to here because of "limitless opportunities for advancement." A highly regarded Principle Systems Analyst, Collins is very impressed with Digital's "people-oriented" environment and positive attitude toward our employees. The opportunity he found here to be an individual and "do a little dreaming about future systems" was the answer Collins was looking for.

Sue

Corporate Operations

Sue was attracted to Digital because of our flexibility. "Of course you have policies, but they serve as guidelines. When it comes right down to it, the individual defines his or her own job." Sue, now a Senior Product Support Analyst, works closely with all other areas of the company to help us as we enter new markets. "People here are so responsive and responsible," she says, "very high-quality people."

Bob

Product Support

Digital gave Bob the opportunity to utilize his military training (US Army Defense School, 1969) in creating a successful civilian career. His technical expertise and reputation as a person who could skillfully handle a critical customer situation — both of which he credits to his military training — have resulted in steady promotions. Currently Bob is a Project Manager in our New Products — Mass Storage group and certain that he found the answer to his career questions at Digital.

The Field Headquarters Organization is located in our Corporate headquarters in Maynard, Massachusetts, approximately 25 miles west of Boston. In Maynard and its surrounding communities you and your family will find excellent school systems, contemporary or colonial homes on large parcels of land, equestrian and hiking trails, camping, and all of the things that make life in New England unique. In addition, we're just minutes from some of the nation's premier educational, cultural, and recreational resources.

In Massachusetts, you'll find what are unquestionably some of the finest lifestyles in the country. At Digital's Field Headquarters Organization, you'll find a dynamic and challenging environment to pursue some of the most exciting projects in the industry . . . and the opportunity for the career you've been looking for. If you would like to find out if the answer Peter, Collins, Sue, and Bob found is also the answer for you, please send your resume, indicating salary history and the areas you would like to explore to the appropriate person, Digital Equipment Corporation, Dept. K912, PK3-1/A41, 162 Main Street, Maynard, Massachusetts 01754. We are an equal opportunity employer m/f

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FLORIDA

370/DOS/VS

I have several openings for Prog/Analyst or Systems Prog Cobol and/or BAL. CICS is necessary on some of them. These positions are open now! Many other openings 12-25K Someone is going to fill these positions — Why not You? Mail your resume today!

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SYSTEMS/PROGRAMMERS, PROJECT LEADERS

Major U.S. multi-divisional company seeks skilled professionals for DP expansion. Responsible for design, control, programming and documentation of on-line s for large 360/370. Ideal opportunity for increasing supervision experiences. Strong analytical skills helpful. Compensation & Benefit program among the finest in industry! Plus outstanding personal growth opportunities! Desirable locations in Southern cities. Progressive state-of-the-art installations. Send resume in complete confidence to:
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A challenging opportunity in a growing multi-CPU environment. To become a senior staff member working with: OS/VS2 SVS HASP4 TOTAL CICS TSO TCAM CPE Hardware/Software evaluation. Must have three to four years combined experience in generation, debugging, maintenance, coding and transition planning in these areas. Analytical ability in computer measurement and evaluation will be considered a plus. Salary range is $17,780 - $26,850 with an excellent benefit program. Send resume and salary requirements to:
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SYSTEMS PROFESSIONALS

Rapid growth at OCLC, a national computerized bibliographic data exchange, results in current employment opportunities. OCLC utilizes Xerox Sigma computers and one of the larger leastline synchronous multidrop communications networks in the nation.

SYSTEMS ANALYST

Salary to $22,000. Requires B.S. in computer related discipline or an equivalent academic/experience combination, 3+ years experience including 2 years of Assembler Language use, experience in design of on-line systems and project leadership. Preference given to candidates with experience utilizing PL/1 or ALGOL, relational data bases, Xerox Sigma or Tandem equipment, and possessing graduate degree and strong communication skill.

PROGRAMMER ANALYST

Salary to $16,000. Requires B.S. in computer related discipline or an equivalent academic/experience combination and 1+ years experience utilizing Assembler Language. Prefer candidates with knowledge of high level language, especially PL/1 or ALGOL, Xerox Sigma, and on-line systems experience.

Excellent benefit package including company paid retirement, relocation, medical coverage, and 4 weeks vacation. Salary commensurate with background and experience. Send complete resume and salary history to Personnel Director:

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Programmers... HELP!

Now that we have your attention, we need several programmers and analysts with backgrounds in COBOL, CICS and Data Base and are willing to pay for them! We offer competitive salaries and a full range of company-paid fringe benefits.

We are currently utilizing an IBM 370/148 OS, but may be changing to a larger system due to increased applications in the areas of Manufacturing and Financial Systems. The Manufacturing team is developing MRP, procurement systems, shop floor control and bill of materials systems. The Financial team is presently working on A/R, A/P, payroll, general ledger, and personnel reporting. In both areas, we provide our people with state-of-the-art tools with which to do their jobs including on-line editing, no cards, and test time. If you have experience and are a "get the job done" individual, we would like to talk with you about joining our Systems Group.

Now that we have told you a few things about us, why don't you tell us a few things about you by sending a resume or calling **BILL LEE, Manager Systems at (213) 390-4451, extension 6288.**

11940 West Jefferson Boulevard
Culver City, California 90230

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Teleprocessing and Systems Support Programmers

The technical support division of the United States Fidelity & Guaranty Company is currently recruiting for the following openings:

- **Teleprocessing Programmer:** Individual will assist in the implementation of a nationwide telecommunications network of IBM 3790's in a leased line VTAM/NCP environment. Future plans for further sophistication include interactive and distributed data base applications. Those individuals who qualify will be trained to support this leading edge application. We will consider individuals having two years' of OS ALC experience with background in SMP.
- **Systems Support Programmer:** Individual will be maintaining current and new versions of the many software products now being installed. Some of these products are CA-SORT, OS/VS COBOL, FDR/DSF, and UCC ONE & TWO. Experience is necessary in SMP and SUPERZAP. Good working knowledge of debugging, JCL and utilities is also needed.

Excellent opportunity for career minded individual who looks forward to eventually expanding abilities into other areas of system support or teleprocessing.

Salary commensurate with experience and abilities. All relocation costs paid by company, liberal benefits package along with comfortable work environment in our modern data processing department.

Please send complete resume, including salary requirements, in confidence to:

Personnel Department
UNITED STATES FIDELITY & GUARANTY COMPANY
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Baltimore, Maryland 21203
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USF&G COMPANIES

UNIVERSITY OF ILLINOIS COMPUTING SERVICES OFFICE URBANA CAMPUS

THE FOLLOWING POSITIONS ARE OPEN WITH THE COMPUTING SERVICES OFFICE:

Computing Documentation Writer

This full time position involves the writing/editing and maintenance of a large scale user document for the services offered on a CDC CYBER 175 and an IBM 360/75. A knowledge of computer programming, experience with time-sharing systems, a university degree with a background in communication arts and experience in composing and/or editing computing documentation are required. The position offers avenues for imaginative expression and initiative. Initial salary: $11,000 to $13,000.

Statistical Computer Consultant

This full time position for a statistical computing consultant involves the research, development and maintenance of statistical software on the CDC CYBER 175 and IBM 360/75 computers. The ability to help computer users with statistical computing is of prime importance. This individual should also have the following qualifications:

- General statistical knowledge a must, while experience with statistical software (SPSS, SOUPAC, SAS, BMD, etc.) desirable.
- Programmer/analyst experience with FORTRAN a must, while knowledge of CDC NOS and IBM OS operating systems desirable.

All applicants should have at least one year of experience in the areas described above, and have a university degree with a background in statistics and computer science or closely related fields. Initial salary: $11,000 to $15,000.

Research Programmer—Senior Research Programmer

This full time position is for an individual with demonstrated skills and achievements in at least one of the following areas:

- CYBER 175 NOS systems programming, development, and performance analysis.
- IBM 360 HASP-OS/MVT systems programming performance analysis and maintenance.
- DEC PDP-11 systems programming and hardware development, with an accent on on-line applications.
- Systems measurement and quantitative performance analysis.
- Synchronous and Asynchronous data communications measurement, analysis and development. Knowledge of CDC 2550 desirable.
- Development and implementation of large storage hierarchies.

All applicants should have at least two years experience as a systems programmer, and have at least a bachelor's degree with a strong mathematical basis. Initial salary: $12,000 to $18,000.

SEND RESUMES BY SEPTEMBER 30, 1977 TO:
Director, George F. Badger, Jr.
Computing Services Office
150 Digital Computer Lab.
University of Illinois
Urbana, Illinois 61801

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SOFTWARE PRODUCT DEVELOPMENT

Link your career to the unprecedented growth of ADR's Software Products Division. Participate in defining, developing, and enhancing our software product line. WE are interested in dedicated software professionals who are capable of doing advanced software development. If you have proven outstanding talents in the job areas shown below, we believe you will want to consider career opportunities at ADR.

SYSTEMS PROGRAMMERS

- MVS experience highly desirable.
- Familiarity with OS internals essential.
- Computer science degree or 2 years experience.

PROGRAMMER/ANALYSTS

- Strong IBM Assembler language background.
- On-line systems development experience in an OS environment.
- At least 2 years experience or a computer science degree.
- Familiarity with DOS and CICS desirable.

MACRO PROGRAMMERS

- Experienced in high-level language interface to Data Base/Data Communications systems.
- IBM Assembler background necessary.
- Working knowledge of COBOL essential.

Some Facts About ADR . . . founded in 1959 . . . development personnel average well over 8 years with company . . . field and sales personnel average over 5 years . . . stable (over $15 million last year) . . . traded on American Stock Exchange . . . employs over 300 people . . . small enough for personal recognition . . . informal and flexible environment . . . representatives throughout the world . . . software product line diverse, versatile, state-of-the-art . . . excellent employee benefits.

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CICS/IMS developer, hands on 370/158 . . .$23-25K
SOFTWARE Support-L.I. loc. OS Hasp . . .$23K
SR. PROG ANAL -Fortune co. 370 SVS data box. Degree . . . $21K
EDP Instructor-Software /hardware . . .$19K
SOFTWARE Engineer-HP 2100/300 R&D . . . $17-23K

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Looking for a change & a challenge? Expanding consulting firm needs experienced people to implement & install financial software systems & train clients in their use.

Prefer individuals with background in educational or municipal data processing, COBOL a must. Data Base Management experience desirable. We offer an excellent salary, fringe benefits & growth potential. If you like variety & are willing to do some travel, call or send resume to:

ARIES

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(612) 835-2366

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University R&D Center seeks B.S. graduate in computer science with three years exoerience in systems analysis and programming to supervise small, but proficient programming staff. Duties to include planning and review of projects, coordinating programming across projects, system design, staff supervision, and consultation with clients. Starting salary $16,644 and up. ALL STATE BENEFITS. CONTACT: Mr. Dave Norris, Urban Affairs, North Carolina State University, Raleigh, N.C. 27607 (919) 737-3211.

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DIRECTOR OF COMPUTER SERVICES

Computer Services provides all administrative, academic and research data processing support for the University of over 11,000 students. The University operates a Xerox Sigma 6 time sharing system with 40 terminals.

The Director has full responsibility for overall supervision of computer operations, coordinating all time sharing batch, remote batch, and real time operations of the Computer Center.

Qualifications: BS degree, with emphais in Computer Science or math desired; 5-10 years experience in the management and operation of a large scale computer center.

Salary: Open, depending upon education and experience.

Submit complete resume to: J. Lawrence Walkup, President, Northern Arizona University, Box 4092, Flagstaff, Arizona 86011
Northern Arizona University is an Affirmative Action, Equal Opportunity Employer M/F.

COMPUTER SYSTEMS ANALYST-MEDICAL

Responsible for design, implementation and coordination of hospital computer applications for an IBM System 370/145 at the University of South Alabama Medical Center Hospital in Mobile. All hospital programming personnel will be responsible to this position. College degree and 3 years' of progressively responsible experience in hospital systems analysis required. Experience with DOS/VS and CICS/VS desired. Gulf Coast location. Excellent benefits package. Salary commensurate with experience. Apply by resume only to:

Office of Personnel Relations

UNIVERSITY OF SOUTH ALABAMA

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DISTRIBUTION MANAGER

Graduate School of Design

Working for the Laboratory for Computer Graphics and Spatial Analysis, the Distribution Manager for Computer Programs, Data Bases and Publications is responsible for the design, implementation and administration of procedures to support the efficient and widespread distribution of all computer based systems and programs for use by other universities, governmental agencies, and other organizations. Receive and process the Laboratory inquiries related to distribution; organize and administer an international user's group for Laboratory computer programs including an annual conference; coordinate the Laboratory's computer program "Conversion Center" activities at several other universities; administer the Laboratory's Computer programs "Distribution Center" activities at several foreign universities; administer the review and improvement of computer program documentation materials. Requirements: BA preferred. 2-3 years experience related to marketing of computer software and services including experience with IBM and DEC computer systems, and experience working with educational institutions and governmental agencies. Demonstrated organizational and communications skills. Some travel involved. Salary range: 12-15K. Starting date: November, 1977.

Please submit resume, in confidence, to: Personnel Office, 6th Floor, Holyoke Center, 1350 Mass. Ave., Cambridge, Mass. 02138.

Harvard University

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SYSTEMS DESIGN MANAGER

The Chicago Loop corporate headquarters of our AMEX-listed, multi-plant, midwestern service corporation is seeking a professional experienced in Management Information Systems design and implementation with a strong background in user interface and orientation. In this newly created position, you'll take over responsibilities now being handled by 2 of our top people. You'll manage a small group of Senior Systems Analysts in our large-sized MIS operation.

YOU NEED:

- B.S. in Business Administration or equivalent; a Master's would be helpful.
- A minimum of 8 years progressive experience in MIS.
- A minimum of 4 years management experience in MIS or consulting experience with users of information systems.
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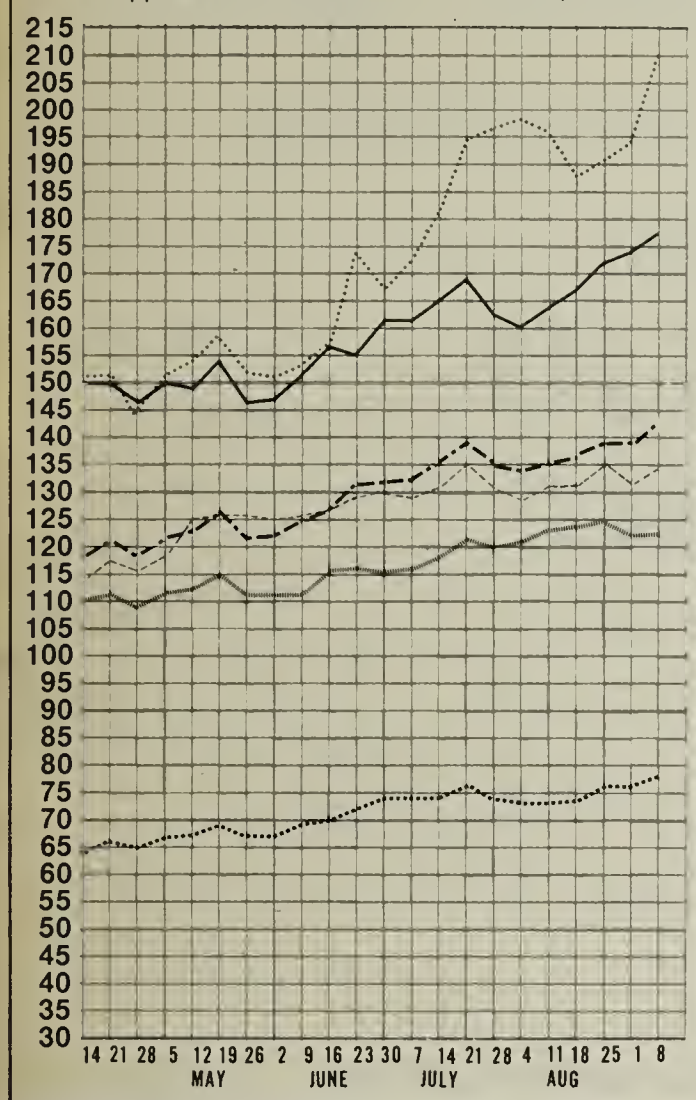
COMPUTERWORLD Computer Stocks Trading Indexes



Earnings Reports

DATA SYSTEMS ANALYSTS
Six Months Ended June 30

	1977	1976
Shr Ernd	$.41	$.20
Revenue	2,301,851	1,761,837
Earnings	267,798	173,960

DATATAB
Three Months Ended June 30

	1977	1976
Shr Ernd	$.06	$.14
Revenue	1,576,289	1,533,130
Earnings	41,451	101,342
6 Mo Shr	.15	.24
Revenue	3,112,549	2,866,750
Eernings	105,729	178,427

EDP RESOURCES
Yeer Ended April 30

	1977	1976
Shr Ernd	$.37	$.89
Revenue	4,954,000	4,792,000
Earnings	353,000	735,000
Revenue	1,319,000	735,000
3 Mo Shr	.16	.11
Revenue	1,319,000	1,269,000
Eernings	152,000	108,000

ELECTRO-CRAFT
Three Months Ended June 30

	1977	1976
Shr Ernd	$.13	$.08
Revenue	4,125,000	2,543,000
Eernings	329,000	208,000
6 Mo Shr	.27	.12
Revenue	7,350,000	4,888,000
Eernings	676,000	310,000

ELECTRONIC ARRAYS
Three Months Ended June 30

	1977	1976
Shr Ernd	.....	$.08
Revenue	$3,409,000	5,049,000
Earnings	(1,109,000)	145,000

ELECTRONIC DATA SYSTEMS
Year Ended June 30

	1977	1976
Shr Ernd	$1.31	$1.10
Revenue	164,188,000	132,952,000
Eernings	16,428,000	13,602,000
3 Mo Shr	.37	.28
Revenue	48,686,000	34,967,000
Earnings	4,656,000	3,532,000

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Terry Williams
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Tristanstrasse 11
West Germany
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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPTEMBER 7, 1977

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

EXCH		1977 RANGE (1)	CLOSE SEP 7 1977	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	AMDAHL CORP	22- 44	42	+1 3/4	+4.3
N	BURROUGHS CORP	55- 91	70 1/2	- 3/4	-1.0
O	COMPUTER AUTOMATION	18- 30	28 3/8	- 1/4	-0.8
N	CONTROL DATA CORP	20- 26	21 1/8	- 1/8	-0.5
O	CRAY RESEARCH INC	15- 29	28 3/4	+1	+3.6
N	DATA GENERAL CORP	35- 51	48 5/8	0	0.0
N	DATAPOINT CORP	18- 32	31 1/2	0	0.0
N	DIGITAL EQUIPMENT	37- 53	48 1/8	0	0.0
N	ELECTRONIC ASSOC.	2- 3	1 7/8	0	0.0
A	ELECTRONIC ENGINEER.	8- 11	10 5/8	+ 5/8	+6.2
O	FOUR-PHASE SYSTEMS	13- 19	18 3/4	+2	+11.9
N	FOXBORO	42- 54	47 7/8	+ 5/8	+1.3
O	GENERAL AUTOMATION	6- 9	7 1/2	- 5/8	-7.6
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	69- 87	80	+ 3/4	+0.9
N	HONEYWELL INC	44- 55	48 1/4	+ 1/4	+0.5
N	IBM	245-286	267 7/8	- 1/2	-0.1
O	MANAGEMENT ASSIST	5- 9	7 1/4	+ 5/8	+9.4
O	MEMOREX	23- 34	33 3/4	+1 3/8	+4.2
O	MICRODATA CORP	7- 18	13 5/8	- 3/8	-2.6
O	MODULAR COMPUTER SYS	5- 8	7 1/2	0	0.0
N	NCR	32- 47	45	- 1/8	-0.2
O	PRIME COMPUTER INC	12- 22	22	+1 3/4	+8.6
N	PERKIN-ELMER	17- 22	20 5/8	+ 1/4	+1.2
N	RAYTHEON CO	16- 33	29 3/4	+1	+3.4
N	SPERRY RAND	34- 42	35 7/8	+ 3/8	+1.0
O	SYCOR INC	8- 15	11 1/4	+ 3/8	+3.4
A	SYSTEMS ENG. LABS	5- 8	7 3/8	+ 3/8	+5.3
A	WANG LABS.	10- 14	13 3/4	+1 1/4	+10.0
	LEASING COMPANIES				
O	ALANTHUS CORP	3- 5	4 1/4	+ 1/4	+6.2
O	BOOTHE COURIER CORP	8- 10	11 3/8	+ 1/8	+1.1
O	COMDISCO INC	10- 13	11 1/2	+ 1/2	+4.5
A	COMMERCE GROUP CORP	2- 2	1 7/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	1 1/8	+ 1/4	+28.5
M	DATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	DCL INC	1- 2	2 1/8	0	0.0
N	DPF INC	6- 9	9	- 1/4	-2.7
N	ITEL	13- 22	20 7/8	- 1/2	-2.3
N	LEASCO CORP	19- 27	24 1/2	+ 1/2	+2.0
O	LEASPAC CORP	1- 2	1 3/4	+ 3/4	+75.0
O	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TFX CORP	5- 11	5 3/4	+ 1/8	+2.2
N	U.S. LEASING	10- 15	14 1/4	+ 1/4	+1.7

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		1977 RANGE (1)	CLOSE SEP 7 1977	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	7/8	0	0.0
O	ANACOMP INC	7- 10	8 1/2	- 3/8	-4.2
A	APPLIED DATA RES.	5- 10	7 3/4	- 1/4	-3.1
N	AUTOMATIC DATA PROC	23- 30	26 3/4	- 1/4	-0.9
O	COLEMAN AMERICAN COS	2- 2	2	0	0.0
O	COMPU-SERV NETWORK	10- 15	12	0	0.0
O	COMP ELECTION SYSTMS	6- 10	9	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 10	9 1/8	+ 1/4	+2.8
N	COMPUTER SCIENCES	7- 9	9 1/8	+ 3/8	+4.2
O	COMPUTER TASK GROUP	1- 2	2	0	0.0
O	COMPUTER USAGE	1- 3	1 3/8	- 1/8	-8.3
O	COMSHARE	5- 7	6 1/4	+ 1/4	+4.1
O	DATA DIMENSIONS INC	3- 5	3 5/8	+ 1/4	+7.4
O	DATATAB	1- 2	1 1/2	0	0.0
N	ELECTRONIC DATA SYS.	16- 20	17 3/8	- 1/8	-0.7
O	INSYTE CORP	2- 3	1 5/8	0	0.0
O	IRS COMPUTER MARKET.	1- 2	1 5/8	+ 1/8	+8.3
O	KEANE ASSOCIATES	3- 4	4	+ 1/4	+6.6
O	KEYDATA CORP	2- 3	2 1/2	+ 5/8	+33.3
A	LOGICON	7- 17	12 1/4	+ 1/8	+1.0
A	MANAGEMENT DATA	1- 2	2	+ 1/8	+6.6
A	NATIONAL CSS INC	19- 26	24 3/8	- 5/8	-2.5
O	NATIONAL DATA CORP	4- 7	6 5/8	+1 1/4	+23.2
A	ON LINE SYSTEMS INC	17- 22	17	- 3/8	-2.1
N	PLANNING RESEARCH	3- 6	5 3/8	- 1/8	-2.2
O	PROGRAMMING & SYS	1- 1	3/8	0	0.0
O	RAPIDATA INC	2- 3	2 5/8	0	0.0
O	REYNOLDS & REYNOLD	17- 20	18 3/4	+ 1/2	+2.7
O	SCIENTIFIC COMPUTERS	1- 4	4 1/4	+ 1/4	+6.2
O	TYMSHARE INC	14- 23	21 1/4	- 3/8	-1.7
A	URS SYSTEMS	4- 5	4 3/8	+ 1/4	+6.0
N	WYLY CORP	1- 2	7/8	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	10- 15	14 3/8	+ 1/2	+3.6
O	ADVANCED MEMORY SYS	7- 9	7 3/8	- 1/8	-1.6
N	AMPEX CORP	8- 11	10 5/8	+ 1/8	+1.1
O	ANDERSON JACOBSON	3- 5	3 3/4	- 1/8	-3.2
N	APPLIED DIG DATA SYS	10- 20	17 3/4	- 3/4	-4.0
O	BEEHIVE INT'L	8- 12	9 7/8	+ 1/4	+2.5
A	BOLT,BERANEK & NEW	7- 8	7 1/4	0	0.0
N	BUNKER-RAMO	8- 12	11 1/4	+ 1/4	+2.2
A	CALCOMP	3- 5	3	+ 1/8	+4.3
O	CAMBRIDGE MEMORIES	1- 4	3 1/2	+ 5/8	+23.9
N	CENTRONICS DATA COMP	22- 30	29 7/8	- 1/8	-0.4
O	COGNITRONICS	1- 1	5/8	+	+10.0
O	COMPUTER COMMUN.	5- 7	8	+1 1/8	+16.3
O	COMPUTER CONSOLES	4- 7	4 1/4	+ 1/4	+6.2
A	COMPUTER EQUIPMENT	2- 3	3	0	0.0
O	COMPUTER TRANSCEIVER	1- 1	1 3/8	+ 1/4	+22.2
O	COMTEN	9- 13	10 3/8	+ 1/4	+2.4
N	CONRAC CORP	19- 28	22 1/4	+1 1/8	+5.3

EXCH		1977 RANGE (1)	CLOSE SEP 7 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	DATA ACCESS SYSTEMS	4- 5	3 3/4	0	0.0
O	DATA 100	6- 9	7 5/8	+ 3/8	+5.1
A	DATA PRODUCTS CORP	9- 16	14 3/8	- 1/2	-3.3
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 2	1 5/8	0	0.0
O	DECISION DATA COMPUT	2- 3	2 3/8	+ 1/8	+5.5
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 9	7 3/8	- 3/8	-4.8
O	DATARAM CORP	2- 8	8	+ 1/4	+3.2
N	ELECTRONIC M & M	4- 5	4 1/8	+ 1/8	+3.1
O	FABRI-TEK	1- 2	1 1/8	+ 1/8	+12.5
O	GENERAL COMPUTER SYS	0- 2	1 1/8	- 1/8	-10.0
N	HAZELTINE CORP	9- 12	8 1/2	- 3/8	-4.2
N	HARRIS CORP	28- 39	37 5/8	+1	+2.7
A	INCOTERM CORP	10- 15	12 1/8	+ 1/8	+1.0
O	INFOREX INC	4- 7	5	+ 5/8	+14.2
O	INFORMATION INTL INC	9- 14	11 1/4	-1	-8.1
O	INTEL CORP	38- 57	46 1/2	0	0.0
A	LUNDY ELECTRONICS	3- 6	4 1/4	+ 1/8	+3.0
O	MSI DATA CORP	6- 12	11 1/2	+1 1/8	+10.8
N	MOHAWK DATA SCI	5- 8	6 1/2	0	0.0
O	PENRIL CORP	2- 5	3 7/8	+ 1/8	+3.3
A	PERTEC CORP	7- 9	9 3/8	+1 1/8	+13.6
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 3/4	- 1/8	-3.2
O	RECOGNITION EQUIP	6- 10	8 7/8	+ 1/2	+5.9
O	SCAN DATA	1- 2	1 3/8	0	0.0
O	STORAGE TECHNOLOGY	10- 16	15 3/8	+ 1/8	+0.8
O	T BAR INC	7- 12	11 7/8	+ 1/4	+2.1
O	TALLY CORP.	4- 6	4 1/2	- 3/8	-7.6
A	TEC INC	7- 10	8	+ 1/8	+1.5
N	TEKTRONIX INC	29- 38	37	0	0.0
N	TELEX	2- 3	2 3/4	0	0.0
O	WILTEK INC	1- 1	5/8	0	0.0
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	6- 8	6 1/4	+ 1/8	+2.0
O	BALTIMORE BUS FORMS	2- 4	2	0	0.0
A	BARRY WRIGHT	10- 14	13 5/8	0	0.0
O	CYBERMATICS INC	1- 1	1	0	0.0
O	DUPLEX PRODUCTS INC	14- 19	17 3/8	+ 3/8	+2.2
N	ENNIS BUS. FORMS	6- 7	6 1/8	+ 1/4	+4.2
O	GRAHAM MAGNETICS	11- 17	16 5/8	+ 1/8	+0.7
O	GRAPHIC CONTROLS	15- 18	15 1/2	0	0.0
N	3M COMPANY	48- 56	52 5/8	+ 1/2	+0.9
O	MOORE CORP LTD	26- 37	28	+ 3/4	+2.7
N	NASHUA CORP	16- 27	25 3/8	+ 1/4	+0.9
O	STANDARD REGISTER	18- 25	21	0	0.0
O	TAB PRODUCTS CO	13- 19	16	- 1/2	-3.0
N	UARCO	19- 22	18 7/8	- 3/8	-1.9
A	WABASH MAGNETICS	10- 15	12 1/2	+ 1/2	+4.1
N	WALLACE BUS FORMS	17- 21	18 1/4	- 1/8	-0.6

Meet FLEXICOM, the only distributed processing system based on IBM 360/370 architecture.

Flexicom is an entirely new approach to building multi-processor networks. Flexicom is the only distributed processing system that uses IBM's 360/370 architecture at *every* location in the network.

This consistent architecture means more flexibility, more power, and much simpler application design. The confusion of linking minicomputer "satellites" to a general-purpose mainframe "host" is gone. Each Flexicom site can run the same applications, use the same database management system, and access the full range of IBM 360/370 software.

Flexicom systems come in a variety of sizes and speeds. They range from small remote satellites to powerful front-ends.

Each Flexicom system is a complete hardware/software package. Each system combines an IBM mainframe with proven software, peripheral devices, and complete transmission control facilities. In addition each member of the Flexicom family is interchangeable with any other, giving you almost unlimited flexibility in network planning.

For Front-Ending

When locally-attached to the host, a Flexicom system provides all of the advantages of a front-end processor—without the need for specialized hardware and software.

A Flexicom front-end will relieve your main computer of all line control, error recovery, queuing, and message switching overhead. Flexicom even supports a complete administrative message switching system that can be selectively or completely independent of the host. Best of all, a Flexicom front-end can off-load all message editing and formatting logic—sometimes more than half the transaction processing load—with little or no user programming.

Your existing staff can write programs for a Flexicom front-end using high-level languages such as COBOL, FORTRAN, and PL/I. This allows you to access your existing database to edit and process messages both before and after they are sent to the host, further reducing the host workload.

For Distributed Processing

When remote from the host, a Flexicom system provides many of the off-loading advantages of a front-end while also functioning as a powerful distributed processor. This means complete support for its own network of terminals, selective access to the host, truly distributed databases using identical host and satellite file structures, plus local batch processing on a full-feature CPU.

As with a Flexicom front-end, developing new applications is simple and straightforward. On-line programs can be written in high-level languages, message editing and formatting logic can be developed interactively at a terminal, and a complete on-line data entry system can be implemented without user programming.

A True Turnkey System

Flexicom is delivered with everything you need: prepackaged software, CPU, peripheral and transmission control hardware, complete installation services and full documentation. Trained Customer Service Representatives will provide on-site education in the use of Flexicom and will also show your staff how to integrate Flexicom into your existing CICS, IMS, or other telecommunication system.

Interested?

We'll be glad to send you a Flexicom brochure or enroll you in a free Flexicom seminar in your area. Just return the coupon or give us a call.

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